HE CHEMICAL AGE

OL LVI 8 FEBRUARY 1947 No 1441

INDEX TO ADVERTISERS
IN THIS ISSUE

Our Master of all Trades

The Ion Exchanger

further explains . . .

My first appearance in these columns caused quite a number of enquiries so perhaps I may be allowed to tell YOU about ION Exchange.

During the last six years ION EXCHANGE materials have played an ever increasing part in new processes. These include the purification of solutions by removal of metallic ions, acids or dissolved salts and recovery of valuable materials from dilute solutions and from industrial wastes.

"Zeo Karb" cation exchange materials and "De-acidite" Anion exchange materials are already known to Industrial Chemists through the Permutit "DEMINROLIT PROCESS" for producing water equivalent in quality to distilled water from crude water without distilling. *ALL* Permutit Processes are now available to industry in general and we shall be glad to help solve your own particular problems.

If you are interested in . . .
(1) Recovery of valuable materials from dilute solutions.
(2) Removal of undesirable materials from valuable solutions (or any similar problems) we will be glad to assist you. We shall be pleased to send full details

PERMUTIT Co. Ltd.

MANUFACTURERS OF ION EXCHANGE MATERIALS

Dept. VA Permutit House, Gunnersbury Avenue, Chiswick, London, W.4. Tel. Chiswick 6431

WATER TO TASTE

Most people prefer to drink their water with something else added to it, and it's there that tastes differ. So few people choose chlorine as a flavouring, however, that after water has been chlorinated to rid it of bacteria many water supply authorities filter it through active carbon to remove the taste of chlorine. After that, any additions are up to the consumer, and Sutcliffe Speakman wash their hands of the whole affair.

SUTCLIFFE SPEAKMAN

SUTCLIFFE SPEAKMAN & COMPANY LIMITED, LEIGH, LANCASHIRE
London Office: Godliman House, Godliman Street, E.C.4 *Phone:* City 9284

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams ALLANGAS FLEET LONDON — Telephone: CENTRAL 3212 (12 lines)

SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970)

MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5)

THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LVI
No. 1441.

8 February, 1947

Annual Subscription 26s.
8d. per copy; post free, 10d.

Deepening Shadows

WE are not generally pessimistic. Even in the darkest days of the depression of the 1920's and early 1930's no one accused this journal of painting a dismal picture. On the contrary, our object has always been to impress upon our readers that difficulties are meant to be overcome and that the way to overcome difficulties is to face them boldly. "Men are at some time masters of their fate," said Shakespeare, and that is still as true to-day as it was when he wrote those words. The fundamental difficulty has arisen in these days, however, that men have less opportunity to be masters of their fate than ever they had before. The constant encroachment of Government on every activity of the nation must inevitably draw us down to a dead level in which those adventurous spirits who in every generation have been the backbone of the nation's prosperity, now find their wings clipped and their activities so circumscribed by Acts of Parliament and Orders in Council as to be unable to fight their way out of the coils of the octopus which holds them in its grip.

There is not the slightest doubt that this country is virtually bankrupt. Whether our rulers confess the fact to us or not it is quite evident that there would be no justification for the austerity in which we now live if it were not for the fact that we are having to cut our coat according to our cloth. When a country or a person is in that condition there are two things which could be done, and done simultaneously. The first is to cut down expenditure as far as we are able in order to make both ends meet. The second is to work doubly hard in order that we may earn more. A condition which permits these measures to take effect is that there shall be freedom for enterprise in every direction. It is the merchant ventures of the country who can pull it out of its present condition, but they can only do this if they are given full support.

We are becoming pessimistic in regard to the support that our merchant venturers are being given. There is no doubt that many people in this country are working harder than ever before. These people are the professional classes and those who occupy analogous positions in industry. Should we be beyond the pale if we suggested that it is the middle classes in general who are working hard to-day? Of the upper classes we can say nothing because there are now no upper classes in the sense in which these words were used ten years ago. One effect of socialism has been virtually to bring us all into the middle or lower class

On Other Pages

categories. We are depressed by the continual insistence of trade unions, *i.e.*, of the lower classes and their representatives, on shorter working hours. It is one thing to stop sweated labour and over-long toil such as disgraced this country in the earlier years of the industrial revolution. It is quite another to be work-shy. That is something which events lead thinking people to believe that the majority of the population in these islands is becoming. We hear on every side demands by trade unions for shorter working weeks. Benn Brothers, proprietors of this journal, introduced the five-day week a long time ago. We have certainly no fundamental objection to the five-day week *provided that output does not suffer*. Those who work the five-day week, however, do not regard themselves as being tied by normal working hours and there must be very large numbers of our colleagues who earn their Saturday off by working beyond the hour of official closing at night.

The five-day week in industry, however, is quite a different proposition. It may be that under certain conditions the amount of work that is done on Saturday morning is so small as not to warrant its continuance. One would imagine, however, that an additional half-hour or so might well be worked each day in order to compensate for the loss of the Saturday morning. If this country were prosperous and had many unemployed the case for the abandonment of the Saturday morning through the employment of additional hands on the other five days of the week might be very strong. Under present conditions, however, it is surely essential that nothing should be done to reduce output in any industry.

One of our mining contemporaries has referred recently to "the deepening shadows of the five-day week." It points out "that the miners will hew more coal by taking a day off every Saturday, a five-day week is to be worked in Britain's State-owned collieries. The engineers have driven the wedge still deeper. Managements of many engineering shops and foundries have agreed to distribute the 44 working hours over five days, although others—notably the ship-builders—have have refused to do so, visualising all too clearly that during the winter months there will be little real work done during the dark hour between 7.30 and 8.30 a.m. Where, one wonders, will this persistent urge for curtailment of the hours of labour end? The positively appalling expense of post-holiday absenteeism in the coal mines is not a happy augury, but the facts are clear. Only the creation of a stronger sense of social responsibility can save the community from industrial disaster. . . . The situation can be saved, but it can only be saved by untiring efforts."

Nor is this all. State control of coal mines, of electricity, of transport, of the Bank of England, of gas, and other industries, must all erect barricades in the face of which private enterprise is powerless. The hampering effect of bureaucratic control accompanied by thousands of Regulations and Orders in Council is seen to-day to be stifling industry and enterprise. The effect of bureaucratic control is very well illustrated by *The Countryman* :—

At a farm which the inspector of prisoner-of-war labour was visiting, the number of men working in the fields was one less than the number allotted. Where was the missing man? The old farmer look worried. He shuffled and hesitated, and finally he cupped his hands to his mouth and shouted, "Willy! come here!" Along came the missing German prisoner. In his right hand he held a pen and in his left a sheaf of papers. The inspector asked why he was not working in the fields. The farmer replied, "Come with me and I'll show you something." He led him into a room where, hanging by the fireplace, there was a long spike on which many papers had been stuck. The papers were of all kinds, large and small, coloured—blue, white, and especially buff. On the other side of the fireplace there were neat bundles of papers, all carefully clipped together. For a moment there was silence. The prisoner stood to attention. Then the farmer explained : "I'm sorry, sir; I can neither read nor write. Since the beginning of the war I'm deluged with letters. They've come from everywhere : the Ministries, the War Agricultural Committee, the income tax—what can I do? I put them all on that spike. Six months ago, Willy comes to me. He can speak English; before the war he was a banker. In six months he's answered my letters and there's the result." He pointed to the neat bundles on the other side of the fireplace. "Ah, he's a good lad is Willy," he sighed. "I couldn't do without him."

An amusing story! But what a commentary on the pass to which control has brought us when the aid of prisoners of war must be invoked to get us out of the maze of forms in which we are engulfed.

NOTES AND COMMENTS

THE 44-HOUR WEEK

THE news that Imperial Chemical Industries, Ltd., has agreed to the principle of establishing a 44-hour week throughout its vast industrial organisation is a matter which must command the attention of all large-scale manufacturers of chemicals. At the moment, " in principle " is the operative phrase in the I.C.I. announcement; in addition to the formidable reorganisation of method and even in some cases of lay-out which would be involved, some form of guarantee will have to be provided by the unions that production levels will be maintained before the principle is given practical effect. It appears fairly certain that if the shorter week is ratified by I.C.I. and the unions the system cannot long be confined, so far as the chemical industry is concerned, to the 50,000 workpeople at the I.C.I. chemical plants. The announcement may therefore be regarded as the possible forerunner of a new principle in the employment of chemical workers and as such evidently will not be calculated to ease the strain on manpower or help maintain the rising totals of chemical exports, lately recorded. To maintain production at existing levels, as I.C.I. has announced its determination to do, will, if the agreement is implemented, need a substantial recruitment to the labour force. That would apply equally to all other plants which may later find themselves parties to similar agreements. While the principle of shorter hours for the same pay is one which we would all like to see in operation, the case for introducing it at the present critical juncture in affairs of manpower and production would be hard to substantiate.

COAL TO OIL

AS the full impact of the coal shortage is felt throughout the country, closing some major industries this week and severely limiting others, large scale coal users are studying with renewed interest the prospect of converting coal-burning plants to heating by fuel oil, on which the authoritative article by Mr. F. J. Erroll, M.P., (THE CHEMICAL AGE, November 30) now derives a renewed topical importance. Some, like Metropolitan-Vickers and the English Steel Corporation, Ltd., at Sheffield, have already gone a long way towards making themselves independent of the fluctuating dispensations of the Regional Coal Committees, and many others must wish that they had earlier taken the same decision, now that the cost of maintaining idle workshops tends to outweigh the previous higher cost of fuel oil, and the lifting of the duty of £1 per ton imposed in 1933 enables liquid fuel to compete on more equal terms with coal. Operating and installation costs, which necessarily vary widely from factory to factory, and difficulties in obtaining the equipment are still, of course, the final arbiters in deciding whether conversion to fluid fuel firing shall provide escape from the present heating dilemma. Operating costs for the basic necessity of steam raising in one typical example seem, however, to be encouraging. Six shell boilers, it is stated, can be fired with oil fuel since the repeal of the duty at a cost of £1028 a week, as compared with £958 for mechanical coal firing. Comparable figures for metallurgical work, vitreous enamelling and some chemical processes are even more attractive. How far the " flight from coal " has already gone is indicated by the statement this week by the Minister of Fuel that since the start of the " coal to oil " campaign consumers of 865,000 tons of coal annually had turned over to oil by 31 December last and that " every possible step was being taken to expedite delivery of storage, distribution and burning equipment."

OIL PRICE INCREASES

THE news of the big increase from February 2 in the prices of commercially important unrefined oils has come as an unpleasant shock to many industries. Linseed oil has been increased by £65 per ton to £200, making an advance of £135 since last September; rape-seed oil is increased by £99 per ton to £190 per ton; castor oil by £70 per ton to £180 per ton; and sperm oil goes up by £35 per ton. These latest advances apply to the period February 2 to March 1. This increase will still further accentuate the shortages in the paint and allied industries and lead to higher prices for paint, varnishes, printing inks, linoleum, leather dressings, and the dozens of other articles for which these oils are used. The increase will probably be deemed to be due to a world shortage of these oils, but there is no doubt that the Argentine, the biggest producer, is holding

out for its pound of flesh. How far, however, the method of block buying and selling can also be called to account for this extraordinary increase, we are not at the moment able to judge, but we certainly have the feeling that it must to some extent share the blame.

ART AND COMMERCE

A PECULIARITY of the recent "Britain Can Make It" exhibition, which gave point to the irreverent sub-title "Britain Can't Have It," was its devotion to comparatively abstract considerations of good design—in which direction its success was unqualified—and the little regard which it paid to purely commercial considerations. This rather anomalous state of affairs is recognised in a review in the *Board of Trade Journal* this week by Mr. S. C. Leslie, Director of the Council of Industrial Design, which planned and controlled the exhibition, who admits that the organisers were taken by surprise by the enormous number of buyers from home and abroad. Only "after the first hectic week or two" was adequate provision made to provide a service of information for buyers and to refer them to trade associations and manufacturers. What was planned primarily for educational and prestige purposes achieved an unforeseen success equally as resounding as a trade fair. The organisers, having done all that they set out to do in presenting a very representative review of the best contemporary industrial design in this country, very reasonably accept no blame for having neglected to make the exhibition a post-war B.I.F. But the fact cannot again be overlooked that the promotion of trade is not the least of the purposes of good design and that there must be sufficient facilities for would-be buyers, especially those from overseas, at any future educational displays. That, however, need not necessarily be the responsibility of the Industrial Design Council. An improvement on a future occasion, which Mr. Leslie himself suggests, is that manufacturers should have a say in the formation of the impartial selection committees, of which more than 50 were needed, and the possibility that industries should make their own choice of goods, of which the selection committees would take account, is also being considered.

SHORTER WORKING WEEK

I.C.I. Agrees "In Principle"

IMPERIAL CHEMICAL INDUSTRIES, LTD., has announced that it has accepted, after negotiations with the trade unions concerned, the principle of establishing a 44-hour week with the retention of the existing weekly rates of pay for all its industrial undertakings. The normal working week in most of the I.C.I. chemical and allied factories at the moment is 47 or 48 hours.

A further conference, THE CHEMICAL AGE understands, is to be held as a result of which, the employees' representatives anticipate, the principle will be ratified. Even if that is done, however, the new ruling, which for a large proportion of workers would introduce a five-day week, could not take immediate effect. Individual factories, the I.C.I. statement points out, would apply the shorter working week as soon as satisfactory arrangements can be made in each case "for the maintenance of the present normal weekly output."

An official of I.C.I. last week emphasised that the company had only agreed in principle to such a rearrangement and that it would not be possible to give effect to it unless the unions co-operated fully in the task of maintaining production at its present level. The change, if it were made, would have to be adopted piecemeal, each factory making its own arrangements, requiring a great deal of planning, both of the processes and of the use of the labour force, a different throughput of various materials, and in some factories change of lay-out. Some of the 50,000 people employed in the chemical and allied sections, out of I.C.I.'s total 80,000, were already working on a 47-hour week basis and they probably could more readily effect a three-hour reduction on the week's working.

Trade Unions' Proposals

The system envisaged by the unions, THE CHEMICAL AGE understands, would provide for day workers 44 hours a week and for shift workers a basis of three shifts on a continuous rota, making an average of 42 hours a week on a four weeks' cycle. The problem of providing the additional workers required to maintain full production could, in the union's view, be solved partly by making greater use of the fringe of surplus labour which they claim some factories now maintain for emergencies.

PRODUCTION OF ALUMINA BY THE LIME-SODA PROCESS*—II

Sources in the British Isles

by W. E. PRYTHERCH, M.Sc., F.R.Ae.S., M. L. R. HARKNESS, B.Sc., and W. D. SPENCER, Ph.D., F.R.I.C.

THERE are numerous sources of alumina in the British Isles. Materials such as china clay, shale, low-grade bauxite, coal ash, etc., all contain a fair percentage of alumina. Low-grade bauxites are to be found in Northern Ireland and Scotland. Shale occurs in several places in England, the largest deposits being in South Wales. China clay, of an excellent quality is present in Cornwall.

Typical regional analyses of these materials are now available in tabular form, as set out in Tables 9, 10, 11, 12, 13, 14.

TABLE 9
IRISH BAUXITES

	Essathorn per cent	Evaskcrowe per cent	Ballintoy per cent	Tuftarney per cent	Skerry per cent	Solomon's Drift per cent
SiO_2	24.90	28.40	17.60	19.80	35.20	39.41
TiO_2	—	—	—	—	—	3.87
Al_2O_3	41.70	29.00	59.10	42.70	34.50	36.48
Fe_2O_3	9.26	22.00	1.97	14.00	3.97	2.98
H_2O	25.40	22.70	25.50	21.00	25.60	—
Ignition loss	—	—	—	—	—	16.63

A comprehensive search has been made to discover sources of shale of high alumina content. Information has been collected from various sources and, where such information is not available, samples have been obtained from collieries and analysed

TABLE 10
SCOTTISH BAUXITES

	Ayrshire per cent	Mid. Scotland Ridge (Beedle & Co.) per cent
SiO_2	17.50	43.39
TiO_2	3.67	—
Al_2O_3	38.25	41.32
Fe_2O_3	2.00	1.75
H_2O	—	1.66
CaO	0.32	0.69
MgO	0.90	1.31
Ignition loss	13.24	10.06

in the laboratories of High Duty Alloys, Ltd., Slough. Various sources of material will now be considered.

Although there are no true shales in Cumberland, a form of shale known as "Rattles" is mixed with the coal and brought to the surface. The colliery waste banks contain thousands of tons of this material which weathers readily to a fine state of division. The analyses set out in Tables 15 and 16 are typical of these types of product.

In the South Wales area there are large banks of shale from the washeries, containing about 30 per cent of alumina, and in certain cases up to 40 per cent. The washery shale normally contains approximately 10 to 20 per cent of total combustibles and other volatile matter. In view of the fact that such large deposits of shale are available in South Wales, a detailed survey of the area was undertaken.

The alumina content of the ash obtained by calcining the shale varied from 20 per cent to 40 per cent at various parts of the coal field and wide variations in the iron content were found. It was hoped that there might be some correlation between the composition of the shale ash and the volatile matter of the associated coal and hence with the geographical position of the deposit, since it is known that the volatile matter of South Wales coal varies in a regular manner as the coal field is traversed.

In order to investigate this, a number of washeries were selected at various parts of the field, and samples of shale collected from them. To obtain representative results, the samples were collected over a period of 4 to 6 hours from the conveyor taking the shale from the washing plant to the tip, each sample being about 5 cwts. The samples were stored in drums to prevent contamination and facilitate transport. Table 17 gives a list of washeries from which samples were collected, together with the amounts of coal treated.

TABLE 11
CHINA CLAY
St. Austell, Cornwall

	per cent				
SiO_2	48.60	49.72	55.40	46.70	43.80
TiO_2	1.00	1.09	—	0.13	0.005
Al_2O_3	32.12	32.13	31.88	38.74	41.00
Fe_2O_3	0.94	8.87	0.68	0.83	1.32
H_2O	—	—	—	—	0.88
CaO	0.23	0.39	0.25	0.14	—
MgO	0.22	0.19	0.21	0.41	—
Ignition loss ...	14.82	8.62	8.62	12.74	12.40

The type of coal mined at the collieries listed covers the entire range of South Wales coal, from anthracite (Gwaumcaegurwen and Glycastle) to bituminous (Nine Mile Point and Blaenavon), through the

*The first part of this article appeared in the CHEMICAL AGE of 25 January, 1947.

range of steam coal and coking coal on the south fringe of the field. To complete the survey, analyses were subsequently obtained of shale from Wern Taru and Llanharen. These analyses were supplied by the Coal Survey Laboratory of the Department of Scientific and Industrial Research at Cardiff. It should be mentioned that there is no pit at Hirwaun, and the coal washed here comes from Tower and Tirherbert pits, from which it is sent by rail. At the Mari-

TABLE 12
COAL ASH

	Cumberland	North-umberland and Durham	Nottingham and Derbyshire	South Wales
	per cent	per cent	per cent	per cent
Al_2O_3 ...	28.84	35.53	34.34	20.0
Fe_2O_3 ...	11.09	9.00	12.14	7.0
SiO_2 ...	37.75	46.86	45.82	65.0
TiO_2 ...	0.79	1.22	0.37	1.5
CaO ...	8.06	3.27	2.00	1.0
MgO ...	2.43	0.65	1.51	1.0
SO_3 ...	8.60	—	—	0.7

TABLE 13
BOILER ASH
(Cardiff Power Station)

Al_2O_3	35.90 per cent
SiO_2	52.10 ,,
Fe_2O_3	5.60 ,,
TiO_2	0.33 ,,
CaO	2.90 ,,
MgO	1.70 ,,
Ignition loss	39.90 ,,

time Washery, samples were taken of the shale from Tymawr and Cwm pits, since the coal from these pits was washed separately.

Since coal washing usually takes place in an aqueous medium, the samples as received were wet. They were first dried at 100°-110°C. in air by spreading out the samples on an iron plate which was suitably heated. As there were no suitable facilities for grinding the samples, they were sent to the Coal Survey Laboratory for sampling. The method employed is a standard one. The dried material was first mixed and crushed to ¼ in. By the method of quartering the sample was reduced to 112 lb. The hundredweight sample was then crushed to pass ½ in. mesh and reduced to 30 lb. At this stage two reference tins (each 10 lb.) were taken, one of these being retained by the Coal Survey Laboratory, and the other sent to Slough, where it was further crushed to 72 mesh. Two bottles were filled with this final sample from which the material for analysis was taken.

Analysis of Shale Samples

In order to obtain a check on the analytical results, shale samples were analysed at Slough, and independently by United Analysts, Ltd., East Holden, Durham. The results are given in Tables 18 and 19; it will be noticed that very fair agreement exists between the two sets of data.

In the case of the United Analysts' results, titanium oxide and phosphoric acid were not separately determined and were included in the alumina figures. In order that the determinations should be comparable with those of High Duty Alloys, a correction has been applied based on the Slough determinations of these two constituents. The analyses supplied by the Coal Survey Laboratory are given in Table 20.

Highest Alumina Content

By comparing Tables 18 and 19, it will be seen that both sets of data agree that the highest alumina content is found in the shale from Blaenavon, Taff Merthyr, Penallta, Tirpentwys, Nine Mile Point and Elliot, the relative order being substantially the same in both tables. The average results for these six washeries are shown in Table 21.

The only case where there is any appreciable discrepancy is in the iron, where the High Duty Alloys determination appears to be rather low. The shales from Llanharan

TABLE 14
SHALE
(Blaenavon, Mon.)

Al_2O_3	36.17 per cent
SiO_2	52.33 ,,
Fe_2O_3	4.61 ,,
TiO_2	1.06 ,,
CaO	1.08 ,,
MgO	1.37 ,,
Mn_3O_4	0.11 ,,
P_2O_5	0.91 ,,
SO_3	0.71 ,,

TABLE 15
ANALYSIS OF DRIED SAMPLE

	I	II	III	IV
	per cent	per cent	per cent	per cent
Combined water and sulphur	14.34	16.88	8.07	12.17
Volatile carbon ...	18.68	35.18	11.08	22.45
CO_2 from carbonates	2.26	3.22	1.21	2.76
Ash	64.72	44.72	78.64	62.62

TABLE 16
ANALYSIS OF ASH

	I	II	III	IV
	per cent	per cent	per cent	per cent
Al_2O_3	36.98	34.60	36.40	35.62
Fe_2O_3	1.98	2.58	2.29	2.52
SiO_2	52.64	50.74	51.40	50.72
TiO_2	0.90	1.96	0.90	1.26
CaO	1.60	2.56	0.64	1.60
MgO	0.90	1.05	1.35	1.86

and Wern Taru both have a high iron content, but they would be of relatively little value owing to the low alumina contents.

When the results of the shale analyses are compared with the rank of the associated coal, as measured by its volatile content, it is found that there is a general tendency for the alumina content to increase and the silica and iron contents to decrease with rise in volatile matter. There are certain quite definite exceptions to this rule, but it is qualitatively true. In the case of alumina, the per cent alumina is approximately equal to $\frac{V - 175}{6}$, where V represents the volatile matter of the coal.

Three samples of shale from St. Helens Colliery Co., Siddick, Workington (United Steel Company) were obtained, having the following analyses.

No. 1 SAMPLE		
As received		
Moisture	0.43	per cent
Ignition loss	48.92	,,
Ash	50.65	,,
Analysis of Ash		
SiO_2	58.54	per cent
Al_2O_3	35.12	,,
Fe_2O_3	2.08	,,
TiO_2	0.88	,,
CaO	0.82	,,
MgO	0.71	,,
Alkalis	—	
SO_3	1.85	,, (by difference)
No. 2 SAMPLE		
As received		
Moisture	0.24	per cent
Ignition loss	51.59	,,
Ash	48.17	,,
Analysis of Ash		
SiO_2	56.60	per cent
Al_2O_3	37.08	,,
Fe_2O_3	3.84	,,
TiO_2	1.07	,,
CaO	0.68	,,
MgO	0.14	,,
Alkalis	—	
SO_3	0.68	,, (by difference)
No. 3 SAMPLE		
As Received		
Moisture	0.40	per cent
Ignition loss	46.49	,,
Ash	53.11	,,
Analysis of Ash		
SiO_2	55.20	per cent
Al_2O_3	40.66	,,
Fe_2O_3	0.88	,,
TiO_2	0.94	,,
CaO	0.38	,,
MgO	0.74	,,
Alkalis	—	
SO_3	1.20	,, (by difference)

These Cumberland samples have a considerably lower ash content than those from South Wales.

Products of Shale Distillation

The ash content of shale varies from 65 to 85 per cent. The ash consists mainly of a mixture of oxides, but in the shale itself the inorganic matter occurs as carbonates, sulphides, etc. When the shale is heated, these compounds decompose with the evolution of carbon dioxide, water vapour and sulphur compounds. The average volatile matter of the shale samples under consideration is 13 per cent. Some of this comes from the inorganic matter in the shale as previously mentioned, and the remainder from the carbonaceous matter associated with the shale. The division of volatile matter between the inorganic and organic components is dependent on the volatile matter of the associated coal, but on an average the 13 per cent can be split up into 8 per cent from the inorganic portion and 5 per cent from the carbonaceous matter. From this it follows that a shale of ash content, 72 per cent would be constituted of the following percentages:

100 { Ash 72 } 80 Inorganic portion
{ Volatile matter 13 { 8 } { 1—5 } 20 Carbonaceous portion
{ Fixed carbon 15 }

The carbonaceous portion, amounting to 20 per cent of the shale, includes the 1 to 5 per cent of free coal, which is capable of mechanical separation, the remainder being so intimately associated with the shale that separation is impossible.

If the shale is subjected to low temperature distillation, the yield of tar obtained should be about a fifth of that obtained from the associated coal. In the case of the high volatile coals from the East and South areas of the coal field this would mean a tar yield of 3.5 gallons per ton of shale treated. As will be shown later, this yield was actually obtained from Blaenavon shale (volatile matter in coal 33 per cent).

Experimental Procedure

The experimental procedure consisted in heating the shale in a vertical tubular retort, 18 in. high and 6 in. diameter, which was placed in a gas-heated furnace. The vapours leaving the retort passed through a water-cooled coil, where the tar and liquors were condensed, and then to a separator where the gas and tar were separated. The gas passed through a meter and was burnt; the tar and liquor were collected in a beaker and separated by gravity. The use of the gas meter was subsequently discontinued since it was found that tar mist in the gas interfered with the operation of the meter.

Temperature was recorded by a thermocouple inserted in the middle of the charge. The usual procedure was to heat the shale gradually to 600°C., carry out most of the distillation at this temperature, and finally to raise the temperature to 800°C. to drive off the last traces of tar. In order to reduce decomposition of the tar, steam was blown through the charge so that the time of contact between the vapours and the hot walls of the retort was a minimum. The total time of heating was four hours, by which time all the tar was found to have been evolved. A charge normally consisted of 14 lb. of shale. The retort was filled through an opening in the top, which was then closed by a cover which was bolted on.

TABLE 21
AVERAGE ANALYSES OF SIX BEST SAMPLES

	H.D.A. per cent	United Analysts per cent	Mean per cent
Ash	72.5	72.1	72.3
SiO_2	53.88	53.97	53.92
Al_2O_3	34.05	34.41	34.23
Fe_2O_3	4.34	5.51	4.93
TiO_2	1.15	—	1.15
CaO	0.87	0.80	0.84
MgO	1.39	1.84	1.81

TABLE 17
LIST OF WASHERIES WITH OUTPUT

Washery	Company	Type of Plant	Total Output of Colliery tons/day	Coal Washed tons/day	Refuse tons/day	Coal in Shale per cent
Blaenavon	Blaenavon Co.	Baum	1,500	1,000	280	5
Nine Mile Point ...	Ocean Coal Co.	Chance	2,000	1,300	270	1
Parc (Treorchy) ...	Ocean Coal Co.	Chance	3,000	2,000	360	1
Tirpentwys	Partridge Jones & John Paton	Baum	1,000	320	40	—
Maritime ...	Powell-Duffryn Associated Collieries	Rheolaveur ...	—	1,300	320	5
Penallta ...		Baum	2,000	1,050	330	3
Elliot ...		Box	—	1,000	279	6
Taff Merthyr ...		Baum	1,300	550	150*	2½
Hirwaun ...		Baum	—	700	120	6
Glyncastle	Cory Bros. (P.D.A.C.) ...	Baum	200	100	15	—
Gwaumcaegurwen ...	Amalgamated Anthracite ...	Baum	1,200	700	120	1½

* Shale returned underground

The tar yield from the various types of shale is given in Table 22, each result being the mean of three experiments. The calculated yields are also given; it will be noticed that agreement between the experimental and calculated results is as good as could be anticipated.

The distillation of shale for tar recovery would not usually be a very attractive proposition owing to the low yield, but if the shale is used as a raw material, it would be used, in which the coke is burnt to give producer gas, and hence additional heat.

The tar had rather a high viscosity and its specific gravity (*see* Table 22) was rather high for a low temperature tar. It was found that a small yield of tar was usually associated with high density and viscosity.

Separation of water from the tar by gravity and centrifuging was not complete, and the method employed was to distill off

TABLE 18
ANALYSES AT SLOUGH

Washery	Ash per cent	SiO_2 per cent	Al_2O_3 per cent	Fe_2O_3 per cent	Mn_3O_4 per cent	TiO_2 per cent	CaO per cent	MgO per cent	P_2O_5 per cent	SO_3 per cent
Blaenavon	74.00	52.33	36.17	4.61	0.11	1.06	1.08	1.37	0.19	0.71
Tirpentwys ...	79.60	55.02	33.28	4.46	0.06	1.33	1.52	1.40	0.19	0.66
Nine Mile Point ...	75.50	54.10	33.05	5.33	0.10	1.26	0.75	1.55	0.18	0.39
Maritime (Tymawr) ...	76.80	58.02	29.26	6.20	0.14	1.17	0.49	1.26	0.20	0.19
Maritime (Cwm) ...	85.90	56.48	29.90	6.50	0.15	1.04	0.38	1.40	0.18	0.08
Penallta	66.20	54.86	33.60	3.72	0.11	1.03	0.69	1.59	0.16	0.32
Elliot	67.80	55.28	32.89	4.41	0.05	1.16	0.63	1.18	0.17	0.16
Taff Merthyr ...	71.80	53.72	36.17	4.61	0.11	1.06	1.08	1.37	0.19	0.71
Parc (Treorchy) ...	74.30	59.52	26.20	5.17	0.12	1.20	0.65	1.65	0.22	0.48
Hirwaun	74.9	53.20	31.89	5.85	0.09	1.18	1.64	1.73	0.19	0.76
Glyncastle	74.90	52.39	30.67	7.62	0.22	0.92	1.55	2.38	0.22	0.86
Gwaumcaegurwen ...	82.30	56.87	28.87	6.24	0.11	1.06	0.79	1.94	0.24	0.36

require to be calcined, in which circumstances the recovery of the tar would be worth while in the case of shale associated with coal of not less than 30 per cent volatile matter. The gas, after scrubbing out benzol, would be used for heating the retort. If the shale were used for aluminium-ferro-silicon production, when the coke residue is required for the reduction, an externally heated retort would be required. For alumina production, this coke is not required, in which case an internally heated retort (such as the MacLaurin retort) could

the water and light oil. The light oil could then be readily separated from the water. Distillation was continued until the temperature reached 350°C., the residue above this temperature being pitch. The light oil was then mixed with the distillate to give the total tar oil, which was fractionated to give light oil (below 170°C.), middle oil (170°-280°C.), and a residue of heavy oil (280°-350°C.) suitable as a fuel oil.

The light oil was refined by washing in succession with dilute sulphuric acid, caustic soda, sodium hypochlorite, concen-

TABLE 19
ANALYSES BY UNITED ANALYSTS

Washery	Ash	SiO_2	Al_2O_3*	Fe_2O_3	CaO	MgO	SO_3	Alk. etc. x
Blaenavon	71.4	52.00	37.22	5.38	1.08	1.80	1.24	0.03
Tirpentwys	78.2	53.43	32.38	6.50	2.05	2.05	1.25	0.82
Nine Mile Point ...	74.4	54.86	33.77	6.25	0.77	1.59	1.32	0.00
Maritime (Tymawr) ...	77.8	57.49	28.33	7.30	0.75	1.40	0.93	2.23
Maritime (Cwm)	86.1	56.09	28.17	8.31	1.35	1.83	0.82	1.99
Penallta	63.6	54.93	35.25	4.38	0.55	1.93	1.21	1.56
Elliot	69.4	55.47	32.02	6.23	0.22	1.90	1.22	1.59
Taff Merthyr	75.8	55.15	35.81	4.31	0.13	1.77	1.18	2.37
Parc (Treorchy)	72.4	59.99	28.97	5.06	0.37	1.94	0.88	1.37
Hirwaun	70.3	52.71	29.95	7.56	2.28	2.27	1.34	2.52
Glyncastle	74.5	53.37	29.26	8.38	1.70	2.09	1.14	2.92
Gwaumcaegurwen ...	83.6	56.76	29.17	7.56	0.43	2.32	1.21	1.23

* Corrected for TiO_2 and P_2O_5. x By difference. Ash as per cent on air—dried sample.

TABLE 20

Washery	Coal Survey Laboratory Analyses: Ash	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	K_2O	Na_2O	P_2O_5	SO_3	Ignition loss
Llanharan	63.6	41.08	24.53	19.72	0.62	2.71	2.79	—	—	0.47	1.32	1.65
Wern Taru	83.3	48.29	23.07	12.46	0.80	4.47	2.84	2.97	0.52	0.38	2.86	1.55

trated sulphuric acid, and caustic soda, with a water wash after each stage except the second. The oil was then distilled.

The yield of refined spirit was about 70 per cent, and consisted of a colourless oil of pleasant odour, resembling petrol, and gum content 0.6 mg. per 100 c.c.

The middle oil was washed with dilute sulphuric acid, caustic soda (to extract the phenols) concentrated acid, soda, and distilled. The refined middle oil had a pale yellow colour and a density of 0.8983 at 25°C. It had the typical odour of low temperature middle oil.

The phenols were recovered from the soda solution by acidifying, followed by distillation. The product, most of which distilled between 190° and 250°C. was a typical cresylic acid of pale colour.

The yields of finished products obtained in the laboratory, per 100 gallons of dry tar, were as follows:

	Gals.
Refined light oil	9
Refined middle oil	10
Fuel oil	16
Refined cresylic acid	6
Pitch	34
Refining loss	25
Total	100

The refining loss was high owing to the small scale of working. On a commercial scale it should be considerably less.

(To be continued.)

TABLE 22.—*Tar Yield from Shale Distilled at 600° C.*

	Volatile in coal. Per cent	Mineral matter in shale. per cent	Tar yield from coal. calc. galls./ton.	Tar yield from shale. calc. galls. ton.	Tar yield from shale. Experimental galls./ton.	Specific gravity of tar.
Blaenavon	33.00	19.00	15.30	2.89	3.50	1.065
Tirpentwys	32.00	14.00	14.50	2.03	1.90	1.067
Nine Mile Point	30.00	17.00	15.20	2.25	1.78	1.060
Maritime	22.00	11.00	7.90	0.87	0.35	—
Penallta	18.00	27.00	5.30	1.42	1.19	1.081
Elliot	16.50	25.00	4.30	1.08	0.84	1.106
Taff Methyr	15.00	22.00	3.30	0.73	0.63	1.101
Parc (Treorchy)	14.50	20.00	3.00	0.60	0.91	—
Hirwaun	11.00	20.00	0.60	0.13	0.17	—
Glyncastle	8.50	—	Nil	Nil	Nil	—
Gwaumcaegurwen	5.50	—	Nil	Nil	Nil	—

References

[16] W. B. Williams, *Bull. Imp. Inst.*, *41* (3), Jan.—Sept. 1943, 197. [17] Anon. *Chem. Eng. and Min. Rev.*, June, 10 1942. 272.

New Sources of Drying Oils

Russian Botanical Experiments

IN the biochemical laboratory of the Botanic Gardens of Batum, S. C. Zhidjavadzé has investigated possibilities of obtaining vegetable oils, especially drying oils, from plants grown in the moist subtropical regions of Russia, including the Batum district, with a view to replacing imported tung oil. Some results are reported in *Sov. Botanika*, Nos. 5 and 6, 1941. Of thirteen different botanical families which were examined, four species of plants proved of interest:

1. *Mallotus japonicus* (Muell). This is one of the Euphorbiaceæ, yielding from the seeds 38 per cent of oil closely resembling tung oil, having a refractive index 1.5130 which is slightly less than that of *Aleurites fordii*. Drying tests gave good results, the film being very smooth and elastic and somewhat lighter than films from other drying oils.

2. *Sapium sebiferum* (Roxb). Another Euphorbiacia yielding two different fatty substances: the seed oil which is a siccative, and a waxy substance from which a hard fat is obtainable. This latter might be of interest to soap-makers.

3. *Buxus sempervirens* (L.). One of the Buxaceæ giving nearly a ton of oil per hectare. The seeds contain 45 per cent of drying oil which gives a lustrous elastic film.

4. *Salvia splendens* (Ker-Gaxl). A member of the Labiatæ family, the seeds of which contain 32 per cent oil which is highly siccative. It is suggested that this plant in the more northerly districts would yield an oil with still higher iodine value and with still more marked drying properties.

French Colonial Oilseeds

Ten Year Development Plan

DETAILS have been published in "*Oleagineux*" (November, 1946) of a ten-year plan for increasing supplies of oils and fats from French oversea dominions, mainly in Africa. Before the war the total weight of oleaginous produce from these sources was nearly a million tons—if the olives of North Africa be included—from which over 400,000 tons of oil or fat was obtained. By far the most important item was the arachis or groundnut of Senegal, over 600,000 tons, mostly in shell but some decorticated; with palm kernels, 145,500, coming next, and then copra, 50,000 tons. Besides the palm kernels, the oil palm also yielded about 36,700 tons palm oil. Other products were the karité or shea nut, cotton seed, and linseed. Estimates for 1946 were about 158,000 tons oil, but this figure was not fully realised.

The table below indicates the expected increase resulting from the ten-year plan (in 1000 tons).

In addition, nearly 100,000 tons cottonseed and 40,000 tons copra are estimated as attainable about 1956. Total seed and nut, therefore, is expected to reach 1,288,000 tons in ten years, yielding some 418,000 tons of oil or fat, to which must be added, as per table, 130,000 tons palm oil and 20,000 tons karité fat (shea butter) exportable out of a total production of 49,000 tons. Thus the exportable surplus is anticipated to be 568,000 tons, with little or no increase from copra. At the end of 20 years, when the new cultivated oil-palm plantations have had time to mature, available exports should be around 700,000 tons oil (or seed and nut equivalent), of which palm oil will contribute 265,000 tons. By that time it is expected that a certain proportion of the oils and fats will be exported in the form of manufactured products, such as soap and margarine.

The requisite organisation for these ambitious plans would include the Institut de Recherches pour les Huiles de Palme et Oleagineaux and a central body representing the Institute, the French Colonial Department (Département de la France d'Outre-Mer), the oversea dominions, and private interests. Among its first duties will be that of a thorough survey of the lands deemed suitable for this increased cultivation of oleaginous plants or for more intensive and efficient use. It will also look after the much larger supply of equipment, plant—such as oil-mills—trained labour and supervisors, and so forth, that will be required. Finance will be found by the State and various credit agencies. Details of the plan are further elaborated under the various principal crops involved—oil-palms, groundnuts, karité, etc.

Territory	Groundnuts Yield	Groundnuts Export	Palm Oil	Palm Kernels plantn.	Palm Kernels forest	Karité fat
French W. Africa						
Senegal	600	750				22
Sudan	200					
Ivory Coast	70		20	25	44	18
Dahomey, etc.	30		60	50	—	4
French E. Africa	150	125	20	20	6	5
Cameroon	100	75	30	35	20	

French imports of oilseeds and oils in the first half of 1946 were :

Oilseeds and nuts (tons)	
Groundnuts in shell	16,260
Groundnuts decorticat.	110,653
Copra	3,720
Karité (shea) nuts	3,126
Palm kernels	28,382
Castor beans	1,955
Misc. (mostly linseed)	3,543
	167,639

Oils (tons)	
Groundnut	1,115
Chinese wood	1,033
Karité butter	765
Linseed	5,143
Palm oil	2,577
Soya bean	2,428
Sunflower-seed	2,310
Misc.	2,221
	17,412

BIG INCREASES IN OIL PRICES

The Minister of Food announces the following changes in the prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four weeks ending March 1, 1947 :

Linseed oil, crude, increased by £65 per ton to £200 per ton naked ex works.

Rape seed oil, crude, increased by £99 per ton to £190 per ton naked ex works.

Castor oil, crude firsts, increased by £70 per ton to £180 per ton naked ex works; seconds, increased by £68 per ton to £176 per ton naked ex works.

Sperm oil, crude heads, increased by £35 per ton to £125 per ton naked ex store; blubber, increased by £35 per ton to £125 per ton naked ex store; carcase, increased by £35 per ton to £123 per ton naked ex store; No. 3, increased by £35 per ton to £122 per ton naked ex store.

Linseed oil foots, increased by £55 per ton to £150 per ton naked ex works.

World News of the Chemical Industry

CANADIAN EXPANSION — ENTERPRISE IN INDIA — ITALY'S RECOVERY — MEXICAN MARKET

NEW products are a major factor in the chemical industry's growth in Canada, George W Huggett, president and managing director of Canadian Industries, Ltd., declares in his annual review. The past twelve months of activity in the chemical and allied industries of Canada have been marked by an active projection of new developments, he states.

The chemical industry's growth is reflected not only in the volume of output, which in 1946 was roughly double that of 1939, but also in further extension of Canadian manufacture of industrial raw materials such as plastics, synthetic rubber, and synthetic fibres. It is reflected also in increased production of Canadian-made basic chemicals, such as sulphuric acid, ammonia, and salt, in the new stress of research, both industrial and governmental, and in the greater diversity within the industry, both in the variety of products and the steadily growing number of producers.

The industry's total output in 1945 was $472,000,000 which included a substantial amount of war material. The 1946 total (statistics for which are not yet available) is expected to be about twice the 1939 figures, which was $159,000,000. The peak war year's chemical production amounted to $765,000,000 in 1943 which included vast quantities of military explosives and small arms ammunition, shell-filling and materials having little or no peacetime use.

Additional manufacturing facilities for paints, synthetic fibres, plastics, and agricultural chemicals are among the major expansion under way at present in the chemical industry. At least a dozen new paint and varnish plants are under construction, ranging in value from $50,000 to $1,500,000 and reaching a total of some $5,000,000. A $5,000,000 plant for the manufacture of viscose fibre is under construction and erection of a plant to make acetate staple fibre is planned. Canada's resources for making such synthetic fibres are almost limitless—sulphite, pulp, electric power, and chemicals made by electric power—and as this development grows, some of the pulp exported for rayon manufacture may instead be used in Canada for the manufacture of yarn, supplies of which may be exported in finished or semi-finished form.

* * *

IMPORTANT post-war developments are taking place in the chemical industry in Baroda, a progressive state which has long played a leading rôle in Indian chemical manufacture.

The Alembic Chemical Works, started by the famous Indian scientists, the late Professor T. K. Gajjar and Mr. Kotibhasker, more than thirty years ago, constitutes one of the principal drug and chemical manufacturing concerns in India. The war led to the inauguration of various other concerns which are now turning over to peace production. Supplementary to the Alembic Works, which has greatly expanded plant and productive capacity of pharmaceutical drugs and fine chemicals, Baroda now has two other large chemical concerns and a number of smaller ones.

These two big new enterprises are Tata Chemicals, Ltd., and Sarabhai Chemicals, Ltd. Tata, which manufactures heavy chemicals, last year produced 3,700 tons of salt, soda ash, bleaching powder, chlorine, hydrochloric acid, etc. The full plant at Okha has not, however, yet started work, and far larger achievement is expected when it comes into production shortly. Tata has also taken over the Pioneer Magnesia Works, which produced magnesium chloride, potassium chloride, and Epsom salts.

The Sarabhai Company has nearly completed the erection of its plant for fine chemicals. The smaller concerns, which include the Petland Chemical Works and the Star Chemical Works, chiefly manufacture sulphuric acid. The latter has recently installed a sodium sulphide plant. Vimso Chemicals and Baroda Chemical Industry, Ltd., both manufacture methylated spirit and alcohol.

* * *

ACCORDING to recent official statements, Italian industry is already working to the extent of 50 per cent of its pre-war level. Very likely this figure would have been much higher were Italy not short of fuel and raw materials.

The Italian chemical industry, however, suffers less from this drawback than the others and as a result it shows a greater progress and forms one of the chief hopes of the country. Many of the raw materials needed by the chemical industry, *e.g.* benzol, naphthaline, sodium chlorate, etc., can be found in Italy itself, and the cost of other chemicals that have to be imported is not particularly high and does not weigh very much on the cost of production. Thus, the hard problem of finding currency with which

to pay imports does not hamper the chemical industry as much as other industries.

The chemical industry is therefore facing the year 1947 with optimisim and is expecting even to supply the whole of the needs of Italy in chemicals. The first thing that leaps to the eye as far as the reviving Italian chemistry is concerned, is the change from war-time production to peace-time needs. In fact, the explosives present themselves with the modest figure of 80 tons of black powder for sporting gun cartridges and 6000 tons of explosives for road and quarry blasting.

On the other hand the chemicals needed in agriculture are receiving a great deal of attention and the following programme of output is envisaged for 1947 :

Sulphate of ammonia ...	200,000	tons
Nitrates	140,000	,,
Cyanamide of calcium ...	95,000	,,
Superphosphates	1,200,000	,,
Sulphate of copper ...	80,000	,,
Sulphur	60,000	,,

The programme for other chemicals of importance is as follows :

Sulphuric acid	860,000	tons
Ethyl alcohol	240,000	,,
Caustic soda	170,000	,,
Calcium carbide	140,000	,,
Paints and enamels ...	54,000	,,
Hydrochloric acid ...	45,000	,,
Organic materials for dyes	50,000	,,
Pigments	33,000	,,
Synthetic resins	25,000	,,
Anhydrous sodium sulphate	23,000	,,
Dyes	20,000	,,

The pharmaceutical branch has done very well. After producing a few hundred tons in 1945 and about 1000 tons in 1946, it is entering 1947 with the programme of 3500 tons. No details are as yet available, but it is interesting to note that the production of 60,000,000 international units of insulin is contemplated. Among other chemical products to be manufactured are 75,000 million matches and over 45 million yards of cinematographic, photographic, and X-ray films.

* * *

THE chemical industry is enjoying a full share of the present record period of industrial development in Mexico, where the number of commercial enterprises rose to 28,000 in 1945 from 14,000 in 1940. Domestic production of chemicals has now increased to more than three times the pre-war volume.

The progress of Mexico's chemical industry is reviewed by Mr. A. W. Evans, Assistant Commercial Secretary, Canadian Embassy, writing in *Commercial Intelligence Journal*, published by the Canadian Department of Trade and Commerce

Mexico is now able to supply ten per cent of her total requirements. He states: Among companies coming into production is the Sosa Texcoco, S.A., having a capital of over 1,000,000 dollars, which is completing a plant to obtain by evaporation from the bed of Lake Texcoco soda ash, caustic soda, salt and potassium salts. Celanese Mexicana, S.A., is erecting a factory near Guadalajara for the production of acetate. Other projects provide for the production of acetyl-salicylic acid, salicylicates, phenol, acetic acid, sodium sulphate, carbon dioxide, penicillin and Manoazo dyes.

About 43 companies, with capital ranging from $10,000 to $2,000,000, are now in operation, as well as eight companies producing chemical by-products. Before the war the Mexican market for chemicals was virtually dominated by Germany, with the United States as the leading competitor. France, although far behind, was the next strongest competitor. By 1943, however, the situation had undergone a complete change. Germany and France could no longer supply, and the United States took over the market completely. At the present time, Mexico's imports are supplied almost entirely by United States chemical houses.

Canada's exports of chemicals to Mexico last year amounted to about $700,000. This figure is very small, however, compared with total imports of over $26,000,000. From the foregoing it is evident that the Mexican market for chemicals is a large and growing one, with increased industrialisation offering a permanently enlarged demand. Although the bulk of the imports are now being made by the U.S., it is believed that France and Britain will emerge as strong competitors once conditions return to normal. With government assistance through tax concessions, import licences and a protective tariff, domestic production can be expected to increase, but many years must elapse before this can offer serious competition, except within a limited range.

A new National Industrial Laboratory now under construction in Mexico City, Mexico, at an initial cost of 1,000,000 pesos will house the Direccion General de Normas, the Mexican equivalent of national bureau of standards.

By February of 1947 it is expected that two auxiliary laboratories, involving an expenditure of 300,000 pesos, and designed for research in fats and hard fibres, will be in operation. For the present the equipment used will be that of the Bureau of Standards.

The ultimate aim of the development in Mexico is to help establish in Mexican industry a modern system of production standards so that manufacturers and consumers can depend on the quality of products bearing the seal of the institution.

ALKALI WORKS REPORTS

Tribute to Management

THE 82nd Annual Report on Alkali Works by the Chief Inspectors for England and Scotland, and covering the years 1939-45 has now been published (H.M. Stationery Office, 1s.).

In the Report the Inspectors pay tribute to the managers and others concerned in the operation of chemical processes who "have acquitted themselves really well in maintaining production and keeping their plant in reasonably good working order in spite of many and great difficulties." The Report notes that the increased demand for sulphuric acid during the war was met by the installation of catalytic contact plants, but many of these have now been closed down. The number of separate processes which came under inspection have not materially increased in the six years, with the exception of benzene, lead, and gas liquor, while the number of tar processes decreased.

During the six years under review 25,328 visits were made to various works by the alkali inspectors, and 7838 quantitative analyses were made of gases escaping to the atmosphere, and 1705 analyses of oils and hydrocarbon spirits.

Spoilbanks :

Up to the end of 1939 the problem of spoilbanks was regarded from a public health aspect, but during the war burning spoilbanks might have become valuable landmarks to the enemy. The inspectors therefore had to concentrate their energies on the elimination of glare. One of the best methods was a continuous fine water spraying. Other expedients were crushing of spoil, segregation of large and incombustible material and binding and blanketting with inert material.

Toluene Control :

Most benzene-distillation plants, designed primarily for the production of motor benzole, solvent naphtha, etc., needed improvements for the separation of a satisfactory toluene fraction. Great difficulty was encountered by the presence of paraffins which distilled over the same temperature range as toluene and were detrimental to the quality of the latter. It was found that the paraffin content of benzoles derived from coal gas produced in horizontal retorts and coke ovens was relatively low.

Benzole Recovery :

The Benzole Recovery Plant Order, 1942, provided that plants for the extraction of crude benzole from gas from the carbonisation of coal should be operated so as to get the maximum yield of toluene. Many older plants intended only for a restricted recovery of crude benzole had little provision for the drastic distillation of wash oil which is required for maximum toluene recovery.

Many new plants were built, however, and included a number at which adsorption of benzole on active carbon was secured.

Smoke, Grit and Dust :

Among the objectionable constituents of smoke and soot and tarry matter (mainly from domestic fires) caused by the incomplete combustion of volatile matter in coal. To use these volatile constituents as fuel is uneconomic and support is given to the proposal that available supplies of bituminous coal should be reserved for processing only. This, think the inspectors, would make for a more economic employment of national coal resources and would in great measure solve the smoke problem.

Unregistered Processes :

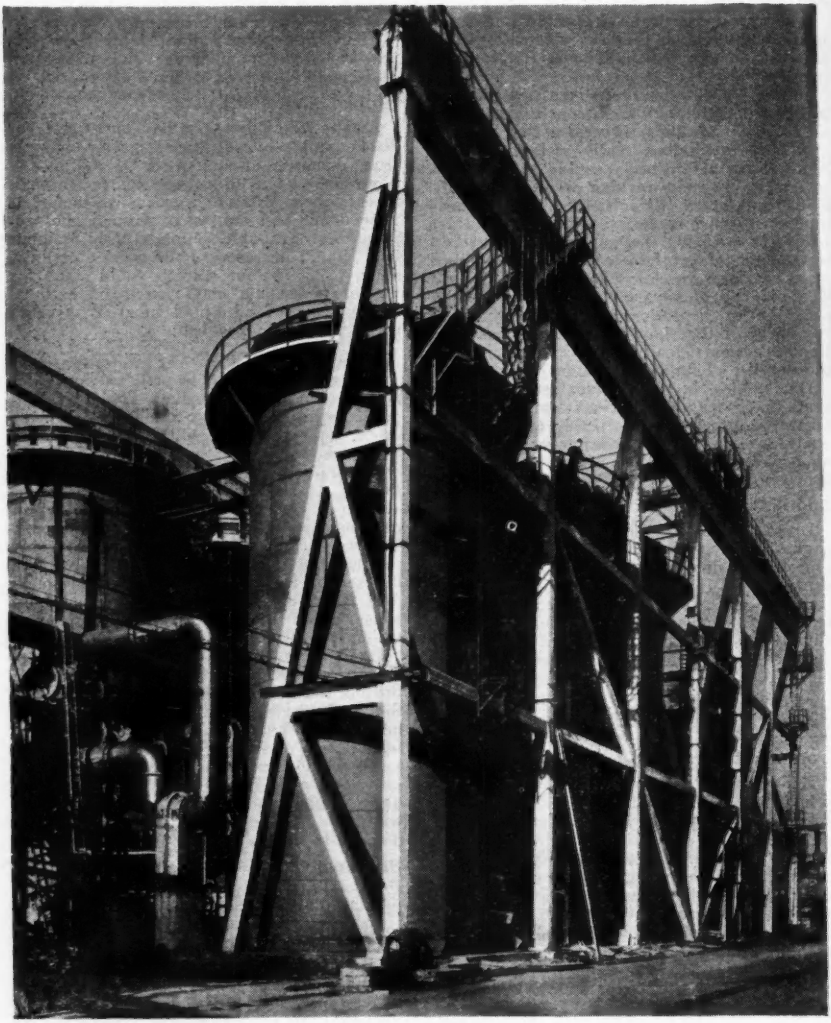
There were 2527 visits paid to works not registerable under the Alkali Act, to investigate complaints, among which the following are of interest. At a yellow ochre works an excessive amount of yellow-coloured dust was stopped by the erection of a water wash tower. At another works droplets of hydrochloric acid were discharged with the hydrogen gas evolved during the pickling process. To arrest the liquid particles the company was advised to draught the gases through a dry scrubber packed with coke. Although dust from cement works is not harmful, in some areas the dust causes annoyance. Chimneys at least 150 feet high are suggested, while kilns fitted with calcinators should be provided with cyclones in front of the electrical precipitators so as to relieve the load on them. Recovered dust should be returned to the kiln only if it can be done in the form of slurry. An investigation was made by doctors of the Ministry of Health into complaints in one Thames-side district. They thought that beyond the nuisance there was no evidence that the dusts caused damage to health.

Sulphuric Acid Works :

The proportion of acid made by the contact process rose from 42.7 per cent in 1939 to 52.3 per cent in 1945.

The number of works registered increased from 980 to 1938 to 1020 in 1945, while the number of processes also increased from 1857 to 1962 in the same period.

Among the future problems facing the inspectors is the investigation of new practices developed during the war, inquiries relating to the escape of gases from new processes not registered under the Alkali Act, and the investigation of smoke problems, including the peace-time control of colliery spoilbanks.



Tower purifiers. An illustration from "Careers in the Gas Industry," reviewed on the opposite page.

CAREERS IN THE GAS INDUSTRY

Opportunities for Would-Be Chemists

THE problem of a career for those leaving school or university is perhaps more complicated to-day than ever before. It is a problem not lessened by the fact that many industries which offer worthwhile prospects choose to hide their light under a bushel.

If, however, the example of the gas industry were more widely followed there would be fewer harassed parents vainly scanning the industrial horizon for portents of their families' future, fewer young men and women taking positions which fail to appeal to them or turn out "blind alleys."

"Careers in the Gas Industry" is the subject of a most attractive and practical booklet just published by the Institution of Gas Engineers, 1 Grosvenor Place, London, S.W.1, which should enable any perplexed young man or woman to decide whether or not his or her job in life lies in that direction.

Waiting for the Right Man

It represents a full and detailed survey of the gas industry and the opportunities the industry offers of a career. As the president of the Institution of Gas Engineers, Mr. C. M. Croft, points out in his foreword, "there is practically no branch of engineering, chemistry, physics, accountancy and other allied professions in which positions are not only available in the gas industry but waiting for the right class of entrant."

Those who have compiled this excellent booklet have clearly realised that the problem for young people is often perhaps unnecessarily difficult because they do not know enough about the various openings which may be available, and it will not be their fault if such young people, having read the booklet, fail to find an answer to all that they need to know concerning the gas industry.

With its attractive illustrations, some of which we reproduce in the accompanying pages, the booklet sets out to answer the more important of those questions likely to arise in youthful minds. It outlines how gas is made, how it is sent to those who use it, what it is used for, and—most essential for the would-be entrant—what sort of work is done in the gas industry and how it is possible to rise to a good position.

The information is well arranged in chapters covering each of the branches in which individual inclinations and special qualifications can lead to good positions. The commercial side as well as the technical is fully explained, and there is a chapter devoted to the opportunities for women.

For those with a bent for science there are obviously wide and ever-expanding oportunities in the gas industry.

To quote from the chapter addressed to the would-be scientist: "The gas industry is in process of becoming more and more of a chemical industry, and the emphasis is increasingly on the applications of chemistry and physics. New processes are being developed by the Gas Research Board and in the private laboratories of gas undertakings and of the manufacturers and builders of plant and appliances.

"These processes, such as the synthetic production of methane and the carbonisation of coal under pressure, may well lead to new chemical developments in the gas industry within the next 10 to 20 years.

"The industry has need of good scientific men, whether they be chemists or physicists or chemical engineers. There are many openings for women on the scientific side, and if we refer to the scientist as 'he,' it must be understood that generally both sexes are included in the masculine pronoun."

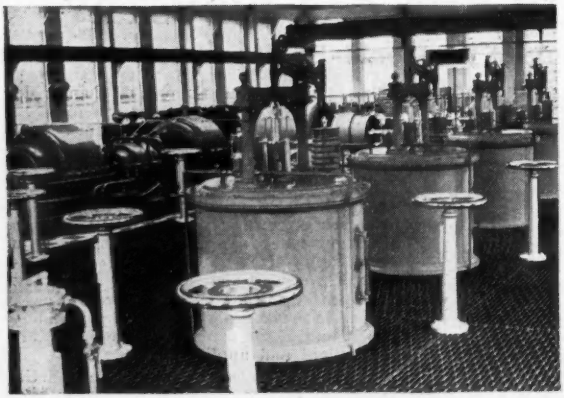
The chapter proceeds to explain the preliminary qualifications required in would-be entrants into this vital section of the gas industry and advises on subsequent specialisation.

Openings for the Chemist

Chemical engineering, for example, clearly plays a large part in the working of the industry. The operations of gas purification, as one instance cited, are wholly applications of chemical engineering; and, it is pointed out, the work of the Gas Research Board is leading to the development of new processes that seem likely to bring the operation of gas manufacture directly under the control of the chemical engineer.

In addition to the research laboratory, the gas industry needs chemists for the works laboratories, which involve much chemical analysis and also the investigation of purely local difficulties in gas manufacture and purification, and often in gas utilisation, such as it is not necessary to submit to the research laboratory.

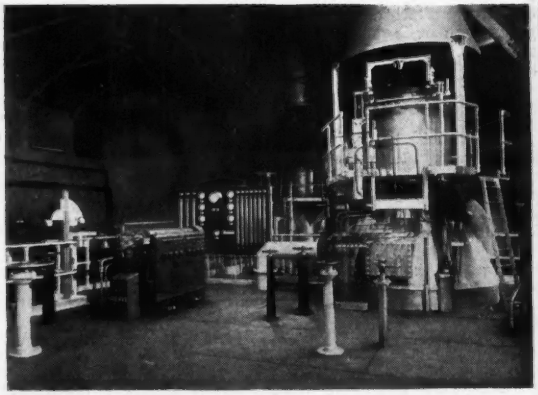
In short, in the closing words of this chapter: "Entry through the laboratory for the able and intelligent young man willing to work hard, is the gateway to opportunity. The gas industry is always on the look-out for the right entrants and is anxious to give them their chance."

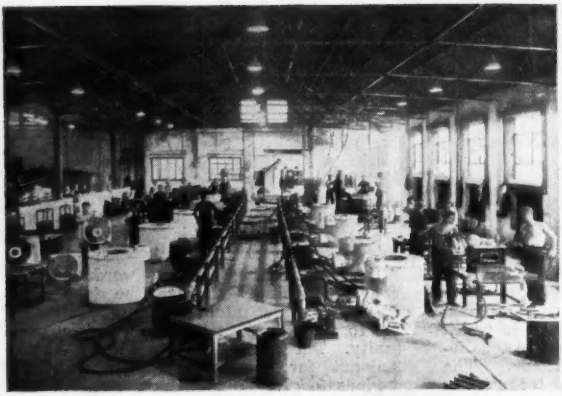


Booster house for distribution of gas under pressure.

Careers in the

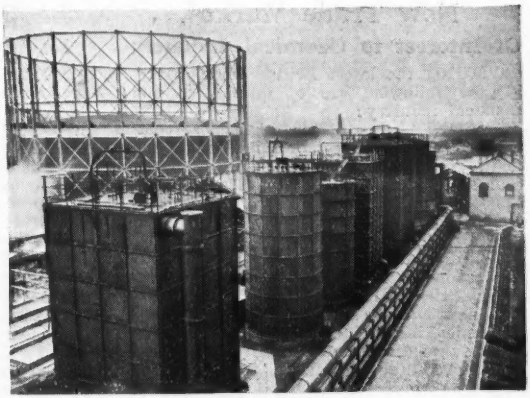
(*Right*) Operating floor of an automatic carburetted water-gas plant.



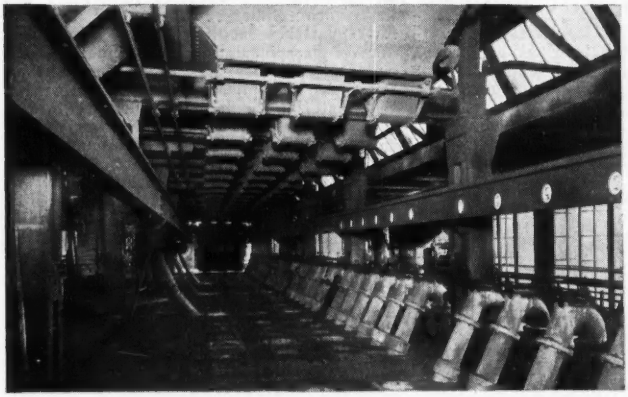


General view of aluminium foundry, with air blast crucible furnaces.

Part of the purification plant.



Gas Industry



(*Left*) Vertical gas retorts: charging floor, showing gas off-take pipes.

Horizontal gas retort house.

New Trade Marks

Of Interest to Chemical Industry

AMONG the latest British trade marks, the following are of interest to the chemical industry:

AVCONIT.—No. 642310, Chemical compounds for use as conditioning media for textile yarns, threads and filaments in the course of manufacture. American Viscose Corporation, Wilmington 99, Delaware, U.S.A.

RIBBITS.—No. 643079. Drugs being chemical substances used in industry, chemical products used in science and photography, chemical products used in agriculture, horticulture and forestry (other than fungicides, insecticides and preparations for killing weeds). Commanditaire Venootschap Chemische Fabriek Rids, Middenhavenstraat 36, Ijmuiden, Netherlands.

EDDIGLIS.—No. 641270. Chemical solutions for application to textiles to prevent ceasing. Margaret Butler Hughes, 221 Neilston Road, Paisley, Renfrewshire.

ASTROLITE.—No. 642214. Chemical products used in science and photography, synthetic resin plastics for industrial purposes (not being paints, varnishes or lacquers or in the nature of rubber) and adhesive substances used in industry. Imperial Chemical Industries, Ltd., Wexham Road, Slough.

JAV.—No. 642017. Chemical products used in industry. Societe "Jav" 29, Rue Emile Zola, Bezons, Seine-et-Oise, France.

SEGMAR.—No. 638389. Glycerine and chemical compounds of glycerine, all for industrial purposes. Sidney Charlesworth & Company, 9 Lee's Yard, Meadow Lane, Leeds, 11. SEGMOST.—No. 638390. As above.

VELTONE.—No. 641597. Fertilisers for lawns. International Toxin Products Limited, 5 Chapel Street, Liverpool, 3.

NIPA and device.—No. 642646. Chemical compounds for use as preservatives and antioxidants in pharmaceutical and medical preparations, in fats and oils (animal and vegetable) in ointments, in emulsions, in essential oils, in perfumes, and in cosmetic preparations. Nipa Laboratories Limited, 44, 45 and 46 Leadenhall Street, E.C.3.

SPRA BONDERITE.—No. 643337. Chemical substances for use in industrial processes in forming coatings on metals by spraying. The Pyrene Company Limited, Great West Road, Brentford, Middlesex.

FARGRO and device.—No. 642037. All goods included in Class 1 except waterproofing solutions and goods of the same description as waterproofing solutions. Chemical products used in industry, science, photography, agriculture, horticulture, forestry, manures (natural and artificial); fire extinguishing compositions, tempering substances and chemical preparations for soldering.

Technical Trends

Developments by Met-Vickers

INTERESTING trends in technical development are indicated in an account of the work of Metropolitan-Vickers Electrical Co., Ltd., in 1946. Outstanding was the large proportion of orders fulfilled for overseas markets. Among smaller steam turbine units ordered for this country was a 1750 kW pass-out unit for Monsanto Chemicals, Ltd., where existing plant consists of two 850 kW Metrovick self-contained units; the pass-out pressure of the new unit will be 160 lb./sq. in. g. A back-pressure turbine unit of 1500 kW has been ordered by I.C.I. Salts Division. Demand for small and medium sized motors was unprecedented; and constant attention was given to improvement of manufacturing processes and use of new materials. Sealing of the windings of general-purpose motors against moisture and treatment of motors for use in tropical climates was studied and new impregnating facilities were installed. Woven glass insulation in conjunction with suitable varnishes has become established for Class B applications; successful use of this material for high temperature insulation is dependent upon the properties of the impregnating varnish, and much practical information on the reaction of the newest qualities of varnish had been obtained. Development and manufacture of paints having special technical properties continued. To meet difficulties caused by shortages of linseed oil, a special "X" series of paints was developed, using a freely available but expensive substitute for linseed oil. Intensive and accelerated ageing and exposure tests were satisfactorily carried out on the "E" series of paints.

B.T.H. In 1946

AS befitted the firm's jubilee year, 1946 was for British Thomson-Houston Co., Ltd., one in which its manufacturing capacity was fully occupied in the execution of orders and in which rapid progress was made in the reconversion from war to peace-time production. A report of B.T.H. developments during the year, just received, makes impressive reading. Important investigations were carried out in its research department and, to further this vital branch, a new laboratory workshop has been set up with machinery for supplying the main bulk of experimental equipment for the research laboratory.

The Minister of Food has made an Order, the Glucose (Central and Maximum Prices) (Amendment) Order, 1947, increasing the price of liquid glucose by 6s. per cwt. from February 1 next, made necessary by an increase in the cost of maize and maize starch.

Coal Crisis Continues

Cuts Render Thousands Idle

TESTIMONY of the widespread industrial dislocation resulting from the failure of coal supplies under the new allocation scheme to measure up to essential requirements are reported from many parts of the country this week of factories of all kinds drastically reducing production times, and in some cases closing down. Probably the largest individual occurrence of this kind was the closing on Monday night of the Austin Motor Company's Longbridge Works, Birmingham, where coal shortage has rendered some 15,000 workpeople idle. The company contemplates paying about £35,000 a week in wages while work is suspended under the guaranteed 34-hour week provision.

A further casualty in the chemical industry was the Monsanto Chemical Works, Cefn Mawr, Ruabon, which had to close down some departments on January 29. An official said that unless there were an improvement in the fuel supply, a further curtailment of production would be necessary. In the north-west it is estimated that 40,000 are unemployed through the coal shortage. Another repercussion was the report on Monday that 500 Harris tweed weavers at Stornoway were faced with the immediate prospect of unemployment because supplies of bichromate of soda, essential for processing the yarn, had been terminated by fuel shortage on the mainland. Government departments were informed and emergency supplies of the chemical were promised.

I.C.I. Works Closes

Workers at the Witton factory of I.C.I. (Metals Division), near Birmingham, where a four-day week was announced on January 28, were told that it would be necessary to close the works for a week. Messrs. Bolton Leathers, Ltd., one of the largest tanneries in the country, are to institute a three-day week in one of their departments owing to fuel shortage. Employees in other departments are to work a five-day week.

The fuel situation was reviewed at a recent meeting of Blackburn Cotton employers' Association and, while dissatisfaction was expressed with the inadequacy of the 65 per cent basis, no resolution was passed, and it will be left for individual employers to work out schemes best suited to their businesses. A Ministry of Labour official in Leeds said on Monday that 120 textile mills in his area, employing 20,000, were idle.

News of other stoppages due to the fuel crisis reported this week included the closing of sections of the English Steel Corporation, Sheffield; failure to reopen sections of the Dunlop Rubber Company's Birmingham works, employing 3500, and widespread reductions of output in the motor engineering industry. These included a forecast by Sir William Rootes that the Coventry and Luton plants of Rootes, Ltd., would have to close unless more coal was forthcoming in a few days; the Nuffield works at Cowley is closed on three days per week through shortage of components; the Rolls-Royce factory at Crewe is to operate a four-day week. Meanwhile, Metropolitan-Vickers Electrical Co., Ltd., Sheffield, are converting their plant to oil-burning.

Mines Output Improves

Stocks Greatly Reduced

A SMALL but perceptible recovery in coal production figures, in output per man shift and in the mining force is shown in the review just issued by the Ministry of Fuel and Power covering the period December 14 to January 25. Output of saleable deep-mined coal in January showed a substantial recovery from the heavy fall at the Christmas period (to 2,274,800 tons in the week ended December 28, and the provisional figure for the week ended January 25, 3,726,000 tons, was within 182,700 tons of the highest previously recorded in the six-weeks period December 14, although rather less than in the two preceding weeks. Similar improvements are shown in open-cast coal production January 25, 164,400 tons), in the number of colliery workers (694,400, against the 692,400 average in December), and output per man (January 18, 1.07 tons).

Offsetting the generally improved production, however, were the heavy increases in consumption by electricity and gas undertakings (totalling 1,173,200 tons on January 25) and fall in stocks to 7,081,800 tons.

A.B.C.M. SAFETY COMMITTEE

Mr. Alec Webster, M.Sc., M.I.Chem.E., A.R.I.C., of the Technical Staff of the Royal Naval Propellant Factory, Caerwent, near Chepstow, has been appointed Safety Officer of the Association of British Chemical Manufacturers. The Works Safety Committee, under the chairmanship of Mr. H. R. Payne, has drawn up a programme of work which is expected to take five years to complete. Prominence is being given to the revision of Part I of the Association's Model Safety Rules for use in Chemical Works (which is now nearly complete), the completion of a " text book " of chemical safety in the shape of Part II of the Rules, and the revision of methods for the detection of toxic gases in industry. Mr. Webster will take up his duties about the end of February, 1947.

NEXT WEEK'S EVENTS

MONDAY, FEBRUARY 10

Society of Instrument Technology. Manchester College of Technology, 7.15 p.m. Dr. H. W. Thompson, O.B.E.: "Infra-Red Absorption Methods for Gas Analysis."

Society of Chemical Industry. Dinner and Dance, Tudor Ballroom, Belle Vue, Manchester.

TUESDAY, FEBRUARY 11

Society of Chemical Industry. (Plastics Group). 26, Portland Place, W.1., 2.30 p.m. Dr. G. Gee: "The Influence of Molecular Structure on the Elasticity and Tensile Strength of Rubber."

Society of Public Analysts. Burlington House, W.1., 6 p.m. Discussion on "Fluorimetric Analysis."

WEDNESDAY, FEBRUARY 12

British Association of Chemists. Gas Industries House, 1 Grosvenor Place, London, S.W.1., 7 p.m. Mr. G. H. Clarke: "Margarine."

Manchester Metallurgical Society. Engineers Club, Manchester. 6.30 p.m. L. F. Pheil, D.Sc., F.I.M., of the Mond Nickel Co. Ltd.: "Metal and Alloys for Service at High Temperatures."

Institute of Physics. Physics Department, Sheffield University, 5.15 p.m. Dr. G. Sykes, F.Inst.P., F.R.S.: "Physics and Steel Making."

Manchester Geological Association. 16, St. Mary's Parsonage, Manchester, Dr. F. M. Trotter, F.G.S.: "Structures in the North-Western Part of the South Wales Coalfield."

Society of Dyers and Colourists. Queen's Hotel, Belfast, 7.30 p.m. Dr. T. Richardson: "The Abbot-Cox Process of Yarn Dyeing as Applied to Cotton."

THURSDAY, FEBRUARY 13

Institution of the Rubber Industry. (Southern Section). The Polygon Hotel, Southampton, 7 p.m. Mr. E. S. Tompkins, B.Sc., A.R.P.S.: "The Pneumatic Tyre."

Chemical Society and Royal Institute of Chemistry. Chemistry Department, Manchester University, 7.30 p.m. Professor M. Stacey: "Some Aspects of the Chemistry of Fluorocarbons."

Pharmaceutical Society. Council Chambers, Houldsworth Hall, Manchester, 7.45 p.m. Professor H. Brindle, B.Sc., F.R.I.C., Ph.C.: "Penicillin."

Institution of Electronics and Illuminating Engineering Society. Reynolds Hall, Manchester College of Technology, 6.30 p.m. Dr. H. Meyers and Mr. G. A. R. Tomes: "Recent Advances in Luminescent Materials for Electronic Devices."

Society of Dyers and Colourists. Great Northern Victoria Hotel, Bradford, 7.15 p.m. Dr. H. P. Standinger: "Polymer Chemistry."

Chemical Society. The University, Woodland Rd., Bristol, 2.15 p.m. Discussion on "Protein Chemistry."

FRIDAY, FEBRUARY 14

Society of Chemical Industry. (Chemical Engineering Group). Burlington House, W.1., 5.30 p.m. Mr. G. Eyssen: "Polyvinyl Chloride and its Co-Polymers."

Textile Institute. Manchester, 1 p.m. P. R. Masheder of Tecalemit Industrial Ltd.: "Lubrication—its Application and Control in the Textile Industry."

Oil and Colour Chemists' Association. Engineers Club, Manchester, 2 p.m. D. H. Hewitt, M.A., A.R.I.C.: "Further Developments in Styrene Co-Polymers."

Paper Makers' Association. Engineers Club, Manchester, 7 p.m. Dr. W. W. Barkas: "The Sorption and Swelling of Cellulose under Naturally Imposed Restraints."

Textile Institute. (Bolton Section). Municipal Technical College, 7.30 p.m. F. Schofield, M.Sc., F.R.I.C., F.T.I.: "A Service by the Dyer to the Manufacturers."

Tasmanian Bauxite

According to the Australian Press, the Australian Aluminium Commission does not think that any single deposit in any Australian State is of sufficient size to provide adequate supplies for Australia. Because Australia's bauxite deposits are said to be low grade, the Australian Press thinks the Aluminium Commission would be well advised to find out if it would be a more economic proposition to obtain the bauxite from other countries to feed the Australian aluminium extraction industry. Among the countries which might export bauxite to Australia would be Tasmania, where, according to the "Industrial and Mining Standard," bauxite deposits have been found.

The 1946-47 linseed oil crop is estimated by the Argentine Ministry of Agriculture at 1,060,000 metric tons (compared with 964,100 tons harvested last season).

Parliamentary Topics

FUEL ALLOCATIONS FOR INDUSTRY

THE slowing or halting of industrial production in practically all parts of the country, due to coal shortages under the new fuel allocation scheme, were again one of the principal subjects of questions in the House of Commons this week. Major P. Roberts asked the President of the Board of Trade why, in this period of shortage of steel for the country's reconstruction programme, he had imposed a 25 per cent cut in fuel allocations to the steel makers of Sheffield; and what proposals he had to increase the allocation of coal, coke and gas. Sir Stafford Cripps replied that reduced allocation was due to the serious shortage of coal and transport difficulties, which had enforced a reduction of 50 per cent on industry generally. Asked what classes of industry, apart from gas and electricity undertakings and steel works, could qualify for increased allocations of coal on grounds of work of national importance, Sir Stafford said it was not possible to specify the industries qualified for supplementary coal. The Regional Fuel Allocation Committees had wide discretion, subject to broad guidance from the Government.

Carbon Black.—Imports of carbon black for the rubber industry from the U.S.A. and Canada in 1946 totalled 29,500 tons, costing approximately $50 million. During the year, 250 tons were imported from Germany at an estimated cost of £11,500.—Sir Stafford Cripps.

Soap Exports.—The Minister of Food, replying to Mr. S. Shephard, stated that soap exports in the past 12 months totalled 20,368 tons; apart from 8700 tons shipped by N.A.A.F.I., the bulk was for Commonwealth countries which depended upon the U.K. for supplies. The whole represented about one-tenth of the present domestic soap ration.

Copper and Zinc Regulation.—Difficulties arising out of a statement by the Non-Ferrous Metals Control that manufacturers would be restricted to a six-months supply of copper and spelter were foreseen by Lieut.-Cdr. Hutchison, who asked the Minister of Supply if this would not prevent manufacturers accepting contracts for forward delivery. Mr. J. Wilmot: Following discussions with representatives of the copper and zinc using industries, the total tonnage of unwrought copper which a firm may hold has now been increased to the equivalent of seven months' consumption. The Ministry's purchase arrangements will not permit a similar increase in the case of zinc. Firms whose holdings of metal are in excess of these permitted quantities have been informed that they may resume taking orders.

Linseed Oil.—Mr. A. C. Bossom wanted to know if the President of the Board of Trade was satisfied that the present allocation of linseed oil was sufficient to meet all the present requirements, including export, and what special provisions were being made to rectify the present shortage. Mr. J. W. Belcher: The Minister of Food is fully alive to the importance of increasing our imports of linseed oil, but, unfortunately, there is a world shortage.

Atomic Chemical Products.—Mr. P. Piratin asked what steps the Minister of Supply was taking to obtain from the U.S. radio-active iodine and other chemical by-products of atomic energy. Mr. J. Wilmot: The American Government have been asked for supplies of radio-active iodine and other isotopes. Their distribution is controlled by the Atomic Energy Commission, which has only recently taken office. Its decision is expected very shortly.

Heating of Ministry Offices.—Between October, 1946, and May this year 350 tons of coal were allocated for heating at the London headquarters of the Ministry of Fuel and Power, 10 per cent less than the corresponding allocation last year. This should be sufficient to heat the offices for the whole period, said the Minister of Works (Mr. Tomlinson) replying to the question by Sir Gifford Fox, "how many days did the Ministry of Fuel anticipate they would be without heat?"

Poor Coal.—The "substantial quantities of stone and earth" contained in coal now being delivered to industrial and domestic consumers were the subject of a question to the Minister of Fuel by Mr. H. W. Butcher, who asked to what extent the inclusion of stone and earth inflated the increased figure of coal production, and what was being done to ensure the restricted deliveries were equivalent in quality to those pre-war. Mr. E. Shinwell maintained that inferior consignments were occasionally unavoidable owing to shortage of labour and coal machinery. The National Coal Board intended to do everything possible to improve the standard of quality. He could not state off-hand what proportion of the increased production represented stone and earth.

Personal

MR. JAMES GRAY, F.R.I.C., an honorary member and former president of the South African Chemical Institute, has been elected Mayor of Johannesburgh.

MR. ELLIS HUNTER has agreed, at the unanimous request of the council, to serve for a further year as president of the British Iron and Steel Federation.

MR. LAURENCE S. ROCKEFELLER, of New York, has been elected director of the Board of the International Nickel Company of Canada, Ltd.

MR. W. K HUTCHISON, controller of by-products for the Gas Light & Coke Co., Ltd., has been appointed a director and a managing director of the company.

MR. W. B. BAMFORD, assistant to the late Mr. W. Wood, who was for 24 years in charge of Non-Ferrous Metals Branch of Thos. W. Ward, Ltd., Sheffield, has been appointed in control of the department.

MR. F. SCOPES, managing director of Stanton Ironworks Co., Ltd., has been nominated by the Nottingham, Derby and Leicester Chambers of Commerce to serve on the Industrial Coal Consumer's Council as a consumers' representative.

MR. H. H. RICHARDSON, of Montreal, who has been appointed president of Aluminium Laboratories, Ltd., and a director of the Aluminium Company of Canada, Ltd., will direct the group's activities at research laboratories in Canada and at Banbury in England. Mr. Richardson has spent over twenty years in the aluminium industry in Canada, Britain and Switzerland.

MR. GEORGE S. JENKINS, whose appointment as Divisional Preparation Engineer for the Scottish Division of the National Coal Board is announced, joined the Fife Coal Co., Ltd., in 1927 as chief chemist, and since 1934 has been fuel technologist and head of the company's preparation department. He is a vice-president of the Institute of Coal Fuel.

SIR HENRY TIZARD is now chairman of the Advisory Council set up to advise the Lord President of the Council in the exercise of his responsibility for the formulation and execution of the Government scientific policy. The Advisory Council will include heads of the principal Government scientific departments and a number of other leading scientists.

MR. C. L. BIRD, M.Sc., F.R.I.C., previously assistant editor, is now editor of the *Journal of the Society of Dyers and Colourists*, succeeding the late Professor F. M. Rowe, D.Sc., F.R.I.C., F.R.S. Mr. Bird is Lecturer in Dyeing at Leeds University and author of a text-book on "The Theory and Practice of Wool Dyeing," about to be published by the Society.

MR. A. R. KNIGHT, A.R.C.S., B.Sc., A.R.I.C., of British Bemberg, Ltd., who has done much work in rayon research; and MR. C. S. NEWTON, M.B.E., B.Sc., of Carpet Trades, Ltd., are new Fellows of the Textile Institute. Elected to Associateship of the Institute are: MR. F. W. BIRCH, A.M.C.T., chemist in charge of the Bleachers' Association's head office laboratory; MR. J. H. WHITEHEAD, B.Sc., of Smith & Nephew Associated Co., Ltd.; and MR. TSUNG-NGO PU, of Shanghai, Dean of the China Textile Institute.

DR. GEORGE P. BEAL, F.C.I.C., who has been appointed director of research and development by International Waxes, Ltd., Agincourt, Ontario, was formerly in the Department of Chemical Engineering, Toronto University, where he carried out research in vapour and liquid catalysts, gas absorption and commercial application of organic chemicals. When the war started, he was stationed at the explosives plant of Defence Industries, Ltd., at Nobel, Ontario, on behalf of the Inspection Board of the United Kingdom and Canada.

Obituary

DR. OTTO SUSSMANN, chairman of the American Metal Company and a director of Anglo-Metal, the Rhodesian Selection Trust, and the Roan Antelope Copper Mines.

MR. S. W. T. LEECH, who has died aged 80, was formerly a director of Leech, Neal & Co., Ltd., colour and paint manufacturers, Derby, which was merged with I.C.I., Ltd., in 1936.

Fatal Explosion

An explosion which blew off the roof of the compressor room at the Cornwall works of Holman, Mitchell & Co., Ltd., lead brass and aluminium manufacturers, of Lead Street, St. Helens, early on February 2, killed one workman and injured three others, two of them seriously. Between twenty and thirty men were at work on the night shift, and several had narrow escapes from injury. Officials of the firm declined to make any comment on the probable cause of the explosion. An official investigation into the explosion was held at the works.

Home News Items

The British Colour Council has moved to new premises at 13 Portman Square, London, W.1, telephone: Welbeck 4185.

Tin metal stocks at December 31, 1946, according to the Ministry of Supply, were: Ministry stocks 7779 long tons; consumers' stocks, 4130 long tons.

Six water tube boilers, of the largest type made in this country, have been ordered for the new generating station at Poplar from Clarke, Chapman and Co., Ltd., Gateshead. The value of the order is stated to be £3,000,000.

Forty-nine of the fifty available stands at the industrial exhibition, part of Warrington's Centenary plans, have already been earmarked by local firms. The exhibition, to be held in the Parr Hall from April 19 to 26, will show the progress made by the town's firms in the past 100 years.

Foreign technicians from eight nations are taking a two-week course of instruction organised by Power Jets (Research and Development), Ltd., at the National Gas Turbine Establishment, Lutterworth, Leicestershire. The course is concerned primarily with the use of the gas turbine as a power plant of general application.

British Ores Development Ltd., intend to open the Rheidol Mines, which lie nine miles from Aberystwyth in the Rheidol Valley. The company hope to employ 200 men at first, and 400 to 500 later on. Every care is to be taken to prevent river pollution. The Mayor of Aberystwyth (Ald. H. G. Pickford) said he understood that ochre (oxide of iron) would be mined and that a company was being launched with £100,000 capital. The company propose bringing their own transport, and Aberystwyth men employed there would be taken to and from work.

Plans to improve supplies and technical service to electric furnace users in South and East Africa and Northern and Southern Rhodesia are to be implemented by the foundation of a new company, Wild-Barfield (South Africa) (Pty.), Ltd., with offices at 51 Milne Street, Durham, by Wild-Barfield Electric Furnaces, Ltd., Watford, in collaboration with E. S. Mowatt & Sons, who have been African agents for the English company for many years. A staff from Watford is now in South Africa.

Plans for the provision of additional factory sites, particularly for heavy industries, were referred to in minutes confirmed by Widnes Town Council recently.

The Metropolitan-Vickers Electrical Co., Ltd., have acquired a factory at Motherwell for use as its "Scottish workshop," where 2000 men and women are expected to be employed.

Bairds and Scottish Steel Ltd., have taken over, as from February 1, the Clippens Limestone Works at Loanhead, Midlothian, of the Shotts Iron Company Ltd. The ironworks will receive part of the limestone while the remainder will, as usual, be treated and sold for agricultural purposes.

H.M. the King has given his patronage to the XIth International Congress of Pure and Applied Chemistry, which is being held in London from July 17 to 25. The last International Congress of the series to be held in London was in 1909, when it brought together a large number of prominent chemists from all over the world.

A Scottish branch of the Science Masters' Association has been formed in Edinburgh with some 300 founder members. Mr. W. J. Lodge, Fettes College, was appointed chairman, and Mr. R. H. Dyball, of London, general secretary, gave an address on the aims and activities of the Association. The branch is to formulate a programme for 1947 and 1948.

British Celanese, Ltd., hope to start production of plastics at their new factory at Marchwiel by the end of March. At present the site, which belonged to a former R.O.F., is being cleared, and contractors are altering and adapting existing buildings. The first building for plastics should be ready by the middle of next month, states Mr. E. E. Stimpson, works manager.

The July-September issue, Vol. XLIV, No. 3, of the *Bulletin of the Imperial Institute* (Imperial Institute, South Kensington, London, S.W.7, 2s. 6d.) has just reached us. Among its contents are articles and notes on interesting aspects of Empire mineral resources, including an abstract of a paper on the Black Rock manganese deposit; notes on mineral production in Sierra Leone and British Guiana; and notes on restrictions affecting the exploitation of radio-active and other minerals in Africa.

Overseas News Items

The War Assets Administration approved the sale of an aluminium reduction plant at Tacoma, Wash., to the Permanente Metals Corporation, Oakland, Calif., operated by Henry J. Kaiser for three million dollars.

According to Chilean press reports, drilling operations for oil at Springhill (Tierra del Fuego) have reached a depth of 2,200 metres. It was anticipated that the oil-bearing strata would be reached during January.

Largest in the world for the manufacture of furfural, the chemical plant at Chelsea and Holmes Sts., Memphis, Tenn., has been sold to the Quaker Oats Co., Chicago, and will operate as a unit of the company's chemical department. The plant will continue to supply the furfural requirements of the United States Government's rubber programme.

Canada's atomic energy plant at Chalk River will be in operation on a peace-time basis, " within the next few months," but Canadians must not expect from it either a " revolution in medicine " or cheap and practical atomic power in the immediate future, Dr. Andre Cipriani, Canadian scientist and McGill graduate, told members of the Canadian Club of Montreal.

Plans for the formation of a dyestuff industry in India are going ahead. According to Dr. Venkataraman, Director of the Department of Chemical Technology, at Bombay University, who has recently returned from a tour which had led him to Germany, Great Britain and the United States, declared that the dyestuff manufacturing programme would form part of a plan to promote the growth of an organic chemical industry.

Advocating continued Government control of the United States rubber supply, Mr. P. W. Litchfield, chairman of Goodyear Tyre and Rubber Company, observed in New York that a tyre made exclusively from natural crude rubber would have certain preference over one containing a large proportion of synthetic rubber and that no American manufacturer would willingly permit competitors such an advantage.

Production of palm oil in Malaya (states of Perak, Selangor, Negri Sembilan, Pahang, Johore and Kelantar) amounted, in the period May-November 30, 1946, to 9,206.1 long tons as compared with 37,836.1 long tons and 34,141 long tons at the corresponding date of 1940 and 1939. The production of palm kernels in these periods totalled 549 3 long tons, 2,975.3 long tons and 3,883 6 tons. Stocks of palm oil at the end of November 1946 totalled 1,751.0 long tons and of palm kernels, 346.9 long tons.

The Consejo Nacional de Petroléos has been created in Colombia as a permanent adjunct of the Ministry of Mines and Petroleum, to advise the Government on all matters connected with the oil industry.

The General Electric Research Laboratory at Schenectady is building new laboratories in nearby Niskayuna. One of these will be the Knolls Atomic Power Laboratory, which General Electric will operate for the U.S. Government.

A decline of 9.6 per cent and 10.7 per cent in state-owned and privately-owned oil wells occurred in 1946. According to Argentine official statistics the total output of petroleum was 1,663,4412 cubic metres from state-owned wells and 793,429 cubic metres from privately-owned wells. The decrease was due mainly to the shortage of oil-drilling machinery.

Two hundred and twenty thousand tons of **potash** were produced last year in the British zone of occupation, equal to about 60 per cent of normal output. The Burbach Kaliwerke A.G. and the Salzdchfurth A.G. have moved from the Russian to the British zone and the Wintershall A.G., another leading producer, is to follow shortly. More plants are to be re-started soon.

The Foreign Office, together with the Board of Trade and the Austrian authorities, have agreed to the establishment of a British-Austrian Chamber of Commerce in Great Britain. It will have the function to bring about and foster economic and industrial relations between Great Britain and Austria and will in general fulfil the duties expected of a Chamber of Commerce.

The U.S. steel industry in 1946 produced some 59,878,000 metric tons of steel, despite the strikes which interfered with production in six months of the year. Given freedom from labour troubles, the American Steel Institute forecasts, steel production will overtake demand. Present annual capacity of the U.S. plants, on which $327 million were spent on modernisation and improvement last year, is said to be 83,720,000 metric tons.

Reynolds Metals Company, Louisville, Ky., has published a new 248-page data book on aluminium alloys and products, featuring 106 tables of technical data. The book discusses alloy tempers, physical properties of high purity aluminium; with nominal chemical compositions, typical mechanical properties, values of density of coefficients of expansion, thermal and electrical conductivity, annealing and heat treating cycles for wrought, sand-casting, and permanent-mould casting.

German Technical Reports

A FURTHER warning has been issued by the Board of Trade arising out of its British Intelligence Objectives Sub-Committee's reports on German industry.

The Board of Trade again points out that, though no invention made in Germany during the period between September 3, 1938, and December 31, 1945, can become the subject of a valid British patent, nevertheless, some of the information gathered in Germany may be covered by valid patents or patent applications in the United Kingdom. In order to avoid infringing patent rights, therefore, firms interested in exploiting any particular item are advised to investigate the patents position in the United Kingdom before going into production. Similar investigations are also desirable before exports are made to any particular country abroad.

The British Intelligence Objectives Sub-Committee exhibition, which was held in London in December (THE CHEMICAL AGE, December 14, 1946, p. 741) is now on tour of the principal provincial centres. The following dates and places have been arranged:

Cardiff (University College, Cathays Park—February 17 to 21); Glasgow (Kelvin Hall—March 3 to 7); Newcastle (Chronicle Hall, Westgate Road—March 17 to 21); Sheffield (City Hall—March 31 to April 4); Manchester (location not yet fixed—April 14 to 18); Belfast (Technical College—May 5 to 9).

Firms without the necessary staff to examine all the reports relating to their particular industries are reminded that BIOS Information Section, 37 Bryanston Square, London, W.1, was set up to perform this service. In addition to dealing with inquiries arising out of reports, this Information Section has access to a considerable number of site reports on German factories and research establishments, original German documents, and supplementary information. All inquiries about German technical processes covered in BIOS, CIOS, FIAT and JICA reports, as well as requests for information which may otherwise be available in the United Kingdom, should be directed to BIOS Information Section.

The following technical reports from the Intelligence Committee in Germany are among the latest now obtainable from H.M. Stationery Office at prices as indicated:

BIOS E/R 200. *Dr. Kurt Herberts and Co.*: Paints.

BIOS E/R 221. *A.G. für Zinkindustrie (Vormals Wilhelm Grille)*: Zinc and zinc alloy.

FIAT 852. English transalation of "N-Chloro-Amides of Higher Molecular Fatty Acids and their Conversion Products (1s.).

FIAT 863. *I.G. Farben, Leverkusen*: Activated-carbon production (1s.).

FIAT 867. Production of mono-vinyl chloride (2s.).

CIOS XXXII—26. Plastics in German aircraft tooling (2s. 6d.).

The following evaluation reports have also been published:

BIOS E/R 236. *I.G. Farben*: Production of barium sulphide and barium sulphate (2d.).

BIOS E/R 281. *I.G. Farben*: Synthetic materials (2d.).

New Companies Registered

Deo-Dis Service Ltd. (428,290).—Private company. Capital £1000 in £1 shares. Manufacturers of insecticides, disinfectants, etc. Directors: M. Capper, A. Eggleston. Registered office: 89 Moseley Street, Manchester.

Newdawn Chemicals Ltd. (428,412).—Private company. Capital £500 in £1 shares. Manufacturers of oils, greases, oleaginous and saponaceous substances, chemicals, etc. Subscribers: E. Tetley, L. Tetley. Registered office: California Works, Gomersal, near Leeds.

Maville Laboratories Ltd. (428,459).—Private company. Capital £1000 in 1000 shares of £1 each. Manufacturers of chemicals for cleaning, sanitary, disinfectant and all other purposes, etc. Directors: D. Astell, E. Durham, F. Moulds, D. Poxon. Registered office: Beech Avenue, Nottingham.

Tars and Oils, Ltd. (428,358).—Private company. Capital £1000 in 1000 shares of £1 each. Manufacturers of coal, coal-tar, petroleum oils, bye-products and products of distillation, etc. Directors: F. and R. Whitmont. Registered office: 68 Wellington Court, St. John's Wood, London, N.W.8.

W. & E. Supplies, Ltd. (428,009).—Private company. Capital: £1,000 in £1 shares. Manufacturers of paint, creosote, tar and disinfectants, manufacturing chemists, etc. Directors: H. Wilson; Mrs. M. Wilson. Registered office: 101-109 Boleyn Road, London, E.6.

John Smythe (London), Ltd. (428,108).—Private company. Capital: £1,000 in £1 shares. Manufacturers of chemicals, gases, drugs, etc. Subscribers: A. Goodwin, C. Evans. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, London, W.C.2.

Chemical Compounds Ltd. (426,468).—Private company. Capital £5,000 in 3,500 6 per cent cumulative preference and 1,500 ordinary shares of £1 each. Research,

etc., chemists; chemical manufacturers, etc. Directors: H. Wolfe; I. Codron; W. Viney. Registered office: 60, St. Paul's Churchyard, London, E.C.4.

Northern Industrial Chemicals Ltd. (428,461).—Private company. Capital £5000 in 5000 shares of £1 each. Manufacturers of synthetic oils, fats, waxes, plastics, paints, synthetic rubber, chemicals, etc. Directors: J. Biggart, G. Hogarth. Registered office: Kirkby Trading Estate, Kirkby, Liverpool.

Walker, Sheppard and Co., Ltd. (428,268).—Private company. January 23. Capital £1000 in £1 shares. To acquire the business of manufacturers and distributors of chemicals and chemical products carried on by Thomas Walker and Felicia Walker as "Sheppard Walker & Co." Directors: T. and F. Walker. Registered office: 26-7 Conduit Street, London, W.1.

Company News

United States Steel Corporation made a net profit for the year 1946 of $88,683,530, compared with $58,015,056 for 1945.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Notice of Dividend

WEST BROMWICH METAL REFINERS LTD., 180a Oldbury Road, Smethwick, Stafford. First dividend, 13s. 4d. per £. When payable, January 22 1947, office of the Official Receiver and Liquidator, Columbia House, Aldwych, London, W.C.2.

Chemical and Allied Stocks and Shares

FURTHER indications of the effect on production of the fuel shortages had a depressing influence on stock markets, industrials receding under the lead of motor shares, though in contrast British Funds remained firm. The latter reflected Mr. Dalton's latest emphasis on the "cheap money" policy. Electricity supply shares remained below their "take-over" levels, and home rails were scarcely affected by the latest Parliamentary discussion on nationalisation. Colliery shares, however, kept firm on break-up value estimates, and Cable & Wireless ordinary stock was good on the view that the result of arbitration in respect of the operating company will indicate a value of over 150 for the holding company's ordinary stock. Argentine rails rose sharply on the latest reports regarding agreement for the sale of the British-owned railways.

As was to be expected, shares of chemical and kindred companies were affected by the fuel situation and the easier tendency in industrials generally. Nevertheless, prices were generally only moderately lower, no heavy selling developing, and, later, buyers were more in evidence. The profit increase and higher distribution announced by Borax Consolidated were up to best market expectations, the deferred units remaining firm at 52s. 3d. Imperial Chemical at 44s. 6d. recorded some recovery from an earlier reaction. Yield at the current price is little more than 3½ per cent, but this is in line with the general return on leading industrials, and moreover in some quarters there are considered to be reasonable possibilities of the higher dividend for the past year being increased above the 8 per cent to which payments have been limited for a lengthy period.

United Molasses have firmed up to 58s., but Turner & Newall remained dull at 91s., and General Refractories, following their recent rise, have reacted to 21s. 6d. Elsewhere, British Plaster Board strengthened to 33s. 6d., and Associated Cement to 67s. 9d., though Lever & Unilever eased to 54s. 3d. British Match, reflecting higher dividend talk, moved up to 53s. 9d. British Oxygen were better at 99s. 4½d., while, after reacting on the further big jump in the price of linseed oil, paint shares became steadier with Pinchin Johnson 54s. 6d., International Paint £7¾, and Goodlass Wall 32s. 3d.

The recent reaction in iron and steels attracted buyers, United Steel being 25s. 9d., Colvilles 25s., and Guest Keen 46s. 9d. Babcock & Wilcox firmed up to 70s. 6d., and Clarke Chapman rose to 63s. 6d., the latter on the big power station contract, valued at £3,000,000. John Summers improved to 34s. 6d. on the new issue terms. Dorman Long were 26s. 9d., and Allied Ironfounders 62s. 9d. Textiles moved narrowly and were slightly lower on balance, sentiment being governed by the fuel news. Bleachers were 14s. 3d., Bradford Dyers 24s. 4½d., Calico Printers 23s. 1½d., and Fine Spinners 25s. 10½d.

Following their recent rise, British Glues & Chemicals 4s. ordinary eased to 17s. 7½d. British Drug Houses were 61s. 3d., W. J. Bush 91s. 3d. xd., B. Laporte 102s. 6d., and Fisons 64s. 6d. Elsewhere, William Blythe were 16s. 6d., British Lead Mills 12s. 3d., and British Tar Products changed hands around 12s. Greeff-Chemicals Holdings 5s. ordinary were 13s. 3d., and Morgan Crucible 60s. Boots Drug were 65s. 6d., Beechams deferred 27s. 7½d., Griffiths Hughes 62s. 9d., but Triplex Glass came back with motor shares, reacting to 35s. 6d. Elsewhere, Low Temperature Carbonisation 2s. shares were firm at 4s. 9d. Oils became easier after earlier gains, Shell being £5½, Burmah 73s. 9d., and Trinidad Leaseholds £5 11/32.

Prices of British Chemical Products

PRESSURE for supplies has been the main feature in the industrial chemicals market during the past week. Reports indicate that buying orders both for home and export have been on a greater scale than can be met for some time ahead and even contract deliveries may have to be pruned as a result of the cut in fuel allocations. So far as values are concerned the undertone continues strong. Owing to the further increase in the controlled price of linseed oil the prices for ground white lead and red lead ground in oil have been advanced as from February 3. Conditions in the coal-tar products market show little alteration, the demand for most items being in excess of available supplies with home requirements receiving priority. Quotations throughout are firm and a change in the controlled rates would not be unexpected.

MANCHESTER.—The critical fuel situation continues to hamper operations both at the producing and consuming ends of the chemical trade, though there is a steady call for supplies of heavy and light chemicals on the Manchester market. Existing orders are being drawn against persistently, and fresh inquiries, including a fair number from shippers, have been in circulation. An easing of the pressure for textile chemicals is a not unlikely development if the effects of the coal shortage become much more widespread. Prices generally on the chemical market maintain a very firm front. The rise in linseed oil prices has resulted in a further substantial advance in ground white and red leads and in the ready-mixed paints.

GLASGOW.—Busy conditions have been experienced in the Scottish heavy chemical market during the past week. Deliveries from the south, however, have been badly curtailed owing to the bad weather and supplies are extremely scarce. There has been a great demand for all classes of heavy chemicals and raw materials with considerable activity in synthetic detergents and soap substitutes. Whiting, formaldehyde, Glauber salts, soda ash, caustic soda, etc., are being greatly sought, but the supply position shows no sign of improvement. Prices remain very firm and any changes are upward. In the export market conditions have been very good and orders have been noted for such products as bleaching powder, carbon tetrachloride, sulphuric acid, fluorspar, talc, precipitated chalk, magnesium carbonate, toluol and other solvents. Prices in this market also remain very firm but the delivery period of most products is extremely extended.

Price Changes

Rises: Acetic acid, acetone, ammonium chloride, antimony oxide, barium carbonate, barium sulphate, copper sulphate, lactic acid, lead acetate, lead nitrate, red lead, white lead, litharge, methylated spirit, potassium carbonate, salammoniac, caustic soda, sodium hyposulphite, sodium metasilicate, sodium phosphate, sodium sulphide, zinc oxide; antimony sulphide, pitch, and linseed and rape seed oil (unrefined).

Decreases: Mercuric and mercurous chloride.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £56 10s.; 80% pure, 1 ton, £58 10s.; commercial glacial 1 ton £70; delivered buyers' premises in returnable barrels: £4 10s. per ton **extra if packed and delivered in glass.**

Acetone.—Maximum prices per ton, 1/5 tons, £86 10s.; single drums, £87 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 galllons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r. MANCHESTER: £16 to £16 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—MANCHESTER: £40 per ton d/d.

Ammonium Carbonate.—£42 per ton d/d in 5 cwt. casks. MANCHESTER: Powder, £43 d/d.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £21 to £25 per ton. See also Salammoniac.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Antimony Oxide.—£135 to £138 per ton.

Arsenic.—Per ton, 99/100%, £38 6s. 3d. to £41 6s. 3d., according to quality, ex-store.

Barium Carbonate.—Precip., 4-ton lots, £20 per ton d/d; 2-ton lots, £20 5s. per ton. bag packing, ex works.

Barium Chloride.—98/100% prime white crystals, 4-ton lots, £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £20 per ton d/d; 2-ton lots, £20 5s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s. B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£25 per ton, ex wharf. Granulated, £30 per ton.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¼d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Carbonate.—MANCHESTER: 1s. 4d. per lb.

Copper Oxide.—Black, powdered, about 1s. 4½d. per lb.

Copper Sulphate.—£41 17s. 6d. per ton f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., from £12 14s. 6d. for 10-cwt. lots to £14 1s. per cwt. lots, d/d. Less than 1 cwt., 2s. 5½d. to 2s. 7½d. per lb. d/d.

Formaldehyde.—£27 to £28 10s. per ton in casks, according to quantity, d/d. MANCHESTER: £28.

Formic Acid.—85%, £54 per ton for ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1260 s.g., £6 per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—11d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Pale tech., £65 per ton; dark tech., £55 per ton ex works; barrels returnable.

Lead Acetate.—White, 95s. to 100s. per cwt., according to quantity.

Lead Nitrate.—About £79 per ton d/d in casks. MANCHESTER: £95.

Lead, Red.—Basic prices per ton: Genuine dry red lead, £86; orange lead, £98. Ground in oil; Red, £113 10s.; orange £125 10s. Ready-mixed lead paint: Red, £123; orange, £135.

Lead, White.—Dry English, in 8-cwt. casks, £97 10s. per ton. Ground in oil, English, in 5-cwt. casks, £123 per ton.

Litharge.—£83 10s. to £86 per ton, according to quantity.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £36 per ton.

Magnesium Chloride.—Solid (ex wharf), £27 10s. per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt lots, 7s. 6d.; smaller quantities dearer.

Mercurous Chloride.—9s. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 4s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 4s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£100 to £105 per ton in ton lots packed in free 5-cwt. casks. MANCHESTER: £5 to £5 5s. per cwt.

Paraffin Wax.—Nominal.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate.—Crystals and granular, 7¼d. per lb.; ground, 8¼d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £57 10s. per ton for 5-ton lots, £57 10s. per ton for 1 to 5-ton lots, all ex store; hydrated, £51 10s. per ton for 5-ton lots, £51 10s. for 1 to 5-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 14s. 3d. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £21 to £25 per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 2s. 1d. to 3s. 0d. per lb. d/d.

Soda, Caustic. — Solid 76/77%; spot, £18 4s. per ton d/d.

Sodium Acetate.—£42 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 6½d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£45 to £47 per ton.

Sodium Hyposulphite.—Pea crystals 22s. 6d. per cwt. (2 ton lots); commercial, 1-ton lots, £17 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., for not less than 28 lb., 10s. 2d. per lb.

Sodium Metaphosphate (Calgon).—11d. per lb. d/d.

Sodium Metasilicate.—£16 15s. per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£23 per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £27 10s. per ton d/d for ton lots. Tri-sodium, £30 per ton d/d for ton lots (crystalline).

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£5 5s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 12s. 6d. to £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £20 12s. 6d. per ton, d/d, in drums; crystals, 30/32%, £13 12s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 5s. to £16 10s., according to fineness.

Sulphuric Acid.—168° Tw., £6 2s. 8d. to £7 2s. 8d. per ton; 140° Tw., arsenic-free, £4 15s. per ton;; 140° Tw., arsenious, £4 7s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £15 8s.; 5 to 10 cwt., £15 9s. 6d.; 2 to 5 cwt., £15 11s.; 1 to 2 cwt., £15 13s. Less than 1 cwt., 3s. 1d. to 3s. 3d. per lb. d/d, according to quantity.

Tin Oxide.—1 cwt. lots d/d £25 10s.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £68 15s.; green seal, £70 5s.; red seal, £71 5s.

Zinc Sulphate.—No quotation.

Rubber Chemicals

Antimony Sulphide.—Golden, 3s. to 4s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£48 to £51 per ton, according to quantity.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes.—White, 10 5/16d to 1s. 5½d. per lb.; dark, 10½d. to 1s. per lb.

Lithopone.—30%, £28 2s. 6d. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton in 6-ton lots, d/d farmer's nearest station, in December £20 4s. 6d., rising by 2s. 6d. per ton per month to March, 1947.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in December £9 18s. 6d., rising by 1s. 6d., per ton per month to March, 1947.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £14 18s. 6d.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £17 5s. per ton; granulated, over 98%, £16 per ton.

Coal Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. MANCHESTER: Crystals, 9½d. to 11½d. per lb., d/d; crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 5½d. to 8d. per gal., according to quality, f.o.r. maker's works. MANCHESTER, 6½d. to 9½d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £7 2s. 6d. to £10 per ton, according to m.p.; hot-pressed, £11 10s. to £12 10s. per ton, in bulk ex works; purified crystals, £25 15s. to £28 15s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 75s. to 80s. per ton f.o.r. suppliers' works; export trade, £6 15s. per ton f.o.b. suppliers' port. MANCHESTER: 77s. 6d. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 14s. 6d. to 18s. 6d. per gal.

Toluol.—Pure, 3s. 2½d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 2½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d. per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediates and Dyes (Prices Nominal

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—December 23. For the period ending March 1 (March 29, 1947, for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package; LINSEED OIL, crude, £200. RAPESEED OIL, crude, £190. COTTONSEED OIL, crude, £80; washed, £84. COCONUT OIL, crude, £80; refined deodorised, £84; refined hardened deodorised, £88. PALM KERNEL OIL, crude, £79; refined deodorised, £84; refined hardened deodorised, £88. PALM OIL (per ton c.i.f.), in returnable casks, £58 10s.; in drums on loan, £58; in bulk, £57. GROUNDNUT OIL, crude, £56 10s.; refined deodorised, £86; refined hardened deodorised, £90. WHALE OIL, refined hardened, 42 deg., £89; refined hardened, 46/48 deg., £90. ACID OILS. Groundnut, £55; soya, £53; coconut and palm-kernel, £58 10s. ROSIN: Wood, 32s. to 45s.; gum, 44s. to 54s. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

Patents in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each. Numbers given under "Applications for Patents" are for reference in all correspondence up to acceptance of the complete specification.

Applications for Patents

Detergents.—R. B. Morrison, R. J. Sexton, and Ph-Entex Products, Ltd. 36478.

Welding metal.—Munro & Miller, Ltd., M. Marr, and F. Hunter. 36877.

Insulating compositions.—Mycalex Corporation of America. 36630.

Insecticides, etc.—N.V. de Bataafsche Petroleum Maatschappij. 36903.

Reduction of iron ore to metal.—R. Nissim. 36686.

Thermoplastic coating.—Prodorite, Ltd., and S. C. Chigison. 36556.

Pyrimidine homologues.—Pyridium Corporation. 37042.

Dressing seeds.—F. L. Sharp, and I.C.I., Ltd. 36543.

Metal compounds.—Sirco A.G. 36532.

Plastic materials.—Soc. des Usines Chimiques Rhône-Poulenc. 37066.

Cellular structures of rubber.—J. A. Talalay. 37049.

Chloro-phenoxyacetic acid.—F. Talbot, and I.C.I., Ltd. 36808.

Heat treating sheet material.—Timsons, Ltd., and E. A. Timson. 36606.

Acrylic, etc., emulsions.—Vinyl Products, Ltd., J. E. O. Mayne, and H. Warson 36424.

Polyvinyl ester emulsions.—Vinyl Products, Ltd., J. E. O. Mayne, and H. Warson. 36425.

Metallic coatings.—A. C. Vivian. 36972.

Magnetic fields.—G. B. Waldron. 36905.

Purified antibiotics.—Wyeth, Inc. 36980

Moulding material.—American Viscose Corporation. 37661.

Moulding compositions.—F. Bacci. 37997-8-9.

Dyestuffs.—W. F. Beech, M. Mendoza, and I.C.I., Ltd. 38022.

Obtaining aluminium from aluminium alloy scrap.—Campagnie de Produits Chimiques et Electrometallurgiques Alais, Froges, & Camargue. 37983.

Recovery of chemicals from viscose.—Courtaulds, Ltd., and H. J. Hegan. 37654.

Catalysts.—Davison Chemical Corporation. 37788-9; 377890-1.

Complete Specifications Open to Public Inspection

Aminobenzene-sulphonamidohalopyrazines and method of preparing same.—American Cyanamid Co. June 26, 1945. 15779/46.

Thiouracils.—American Cyanamid Co.—June 29, 1945. 15780/46.

Producing iron in pure or alloyed state.—E. G. R. Angel. June 30, 1945. 19440/46.

Separating gangue containing materials from ores or the like containing dense substances such as minerals.—Bolidens G/A. June 21, 1945. 18604/46.

Articles from multi-coloured plastic materials by extrusion.—J. Delomore. June 23, 1945. 18754/46. June 22, 1945. 18755/46.

Treatment of synthetic linear polyamides.—E.I. Du Pont de Nemours & Co. Sept. 9, 1940. 11527/41.

Manufacture of peroxides.—E.I. Du Pont de Nemours & Co. June 29, 1945. 19448/46.

Organic fluoro-compounds.—E.I. Du Pont de Nemours & Co. June 30, 1945. 19453/46.

Forming a powder from metals.—H. R. Forton. June 25, 1945. 15845/46.

Stabilised silver halide emulsions.—General Aniline & Film Corporation. July 1, 1944. 17234/45.

Haloacrylic compounds.—General Aniline & Film Corporation. June 23, 1945. 15635/46.

Alpha-halogen substituted acrylic compounds.—General Aniline & Film Corporation. June 23, 1945. 15636/46.

Halocrylic acid esters.—General Aniline & Film Corporation. June 23, 1945. 15637/46.

Resinous products derived from haloacrylic acid compounds.—General Aniline & Film Corporation. June 23, 1945. 15638/46.

Haloacrylic compounds.—General Aniline & Film Corporation. June 23, 1945. 15639/46.

Alpha-substituted haloacrylic compounds and their manufacture.—General Aniline & Film Corporation. June 23, 1945. 15640/46.

Alloys or metallic mixtures required to have low work function characteristics.—General Motors Corporation. May 20, 1943. 10648/44.

Complete Specifications Accepted

Production of acetylenic alcohols.—Shell Development Co. Nov. 23, 1942. 582,764.

Apparatus for the dry spinning of artificial filaments from alkaline casein solutions.—R. Signer. April 12, 1943. 582,765.

Defiberising machines for preparing fibrous mouldable compositions.—H. Snow, and R. H. Hocutt. July 27, 1943. 582,816.

Separation and segregation of diolefins from hydrocarbon mixture.—Standard Oil Development Co. Aug. 4, 1942. 582,713.

Catalytic dehydrogenation of hydrocarbons.—Standard Oil Development Co. Aug. 26, 1942. 582,759.

Copolymerisation of iso-olefins and diolefins.—Standard Oil Development Co. Sept. 6, 1941. 582,887.

Processes for obtaining cholic acid from bile and animal excretions. A. H. Stevens.

(Armour & Co.) April 26, 1944. 582,772.

Process for the clarification of glycerol liquors obtained by the fermentation of natural occurring carbo-hydrates such as molasses.—Sylvania Industrial Corporation. Aug. 6, 1943. 582,908.

Production of naphthyridones and of naphthyridines therefrom.—Therapeutic Research Corporation of Great Britain, Ltd., and V. A. Petrow. Sept. 21, 1944. 582,872.

Production of unsaturated hydrocarbon products from petroleum refining residues.—Wilmington Chemical Corporation. July 22, 1943. 582,789.

Pre-treatment of vessels for chemical reactions.—C. Arnold. (Standard Oil Development Co.) Nov. 28, 1944. 583,750.

Synthetic resins.—A. Bowman, E. M. Evans, and I.C.I., Ltd. Nov. 29, 1944. 583,754.

Brazing alloys.—British Thomson-Houston Co., Ltd. Nov. 25, 1943. 583,737.

Treatment of polyvinyl chloride.—J. A. Crabtree & Co., Ltd., and F. G. Dodd. Nov. 23, 1944. 583,730.

Coating compositions.—E.I. Du Pont de Nemours & Co. Nov. 16, 1943. 583,670.

Compositions comprising polyvinyl fluoride.—E.I. Du Pont de Nemours & Co. Nov. 19, 1943. 583,686.

Manufacture of aminotriazines.—E.I. Du Pont de Nemours & Co. Nov. 23, 1943. 583,720.

SITUATIONS VACANT

CHEMIST to take control of works laboratory controlling productions of heavy and fine chemicals, and to undertake the development and control of new processes. Full details of experience and salary to JOHN NICHOLSON & SONS, LTD., Church Street, Leeds, 10.

CHEMIST, young, qualified in detergents, disinfectants' polishes, etc. to carry out tests, experiments and supervise process in works. Permanency for right man. Applications must be accompanied by fullest details of experience, references, age and salary required, which will be treated in strict confidence. Box No. 2423, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

LABORATORY Steward (Man), required for the Chemistry Department of the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3. The commencing rate of pay will be £250 per annum, rising by annual increments of £15 to £295 per annum, plus at present a cost-of-living addition of £78 per annum. Applications by letter, stating age and experience, to the Principal at the Institute.

PLANT Chemists urgently required for process plant operation by large company operating in the Middle East. Applicants need not be graduates but should have had a chemical training up to Inter B.Sc. or National Certificate standard, with experience of shift work in either a gas, coke oven or chemical works. Age not over 30. Salary in Sterling between £540 and £600 per annum, plus generous allowances in local currency, with free furnished bachelor accommodation, passages out and home, medical attention, also kit allowance and Provident Fund benefits. Apply, stating age, qualifications and experience, etc., to Dept. F22, Box No. 2357, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

THE British Oxygen Co., Ltd., have a few vacancies for Research Chemists and for Chemical Engineers. Candidates for research posts must be honours graduates with several years University or Industrial research training, preferably in physical or organic chemistry. Chemical engineers must be graduates of similar standing, but with chemical engineering training or experience and with a sound understanding of thermodynamics, since they will be required to carry out development work on low temperature processes generally. Applications giving age, qualifications and experience should be made to the DIRECTOR OF RESEARCH & DEVELOPMENT, The British Oxygen Co., Ltd., Grosvenor House, Park Lane, London, W.1.

SITUATION VACANT

WORKS Manager for a fertiliser works. Salary according to qualifications and experience. Good position for the right man. Previous experience in works management essential. Apply Box No. 2426, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

FOR SALE

THREE new and unused **STEAM DISINFECTORS or DRYERS,** comprising mild steel cylindrical vessel, 6 ft. 6 in. dia. by 7 ft. long, jacketed for 15 lb. working pressure, and 10 lb. working pressure in body, with 6 ft. 6 in. dia. quick-release doors at each ends; units equipped with wire basket trolleys running on rails for easy handling.

50 ft. by 5 ft. Mild Steel **ROTARY DRYER,** arranged for solid fuel heating, driven through link chain to dryer, reduction gear and Vee rope to motor.

Methyl Chloride **REFRIGERATION PLANT** by L. Sterne, comprising two 3P6 compressors with two 25 h.p. motors, water pumps, brine pumps, ice tanks, etc.

VACUUM PUMP by Storey Bros., vertical single cylinder, 12 in. dia. by 10 in. stroke, 91 r.p.m.; capacity about 60 c.f.m. dry vacuum, arranged for belt drive.

VACUUM PUMP by Pears; vertical single cylinder, 6 in. dia. by 6 in. stroke, belt drive.

TWO—**VACUUM PUMPING SETS,** each comprising Worthington Simpson air-cooled vacuum pump with two inclined cylinders; 550 r.p.m., overhung flywheel pulley grooved to receive three Vee ropes and arranged drive through Vee ropes, each with 2 h.p. S.C. motor by B.T.H., 400 volts, 3-phase, 50 cycles, 1,425 r.p.m.

8 in. by 10 in. Horizontal Dry Double-stage **VACUUM PUMP** by Pilkington; drive from fast and loose pulley.

Single-cylinder Horizontal **SPIRIT PUMP** by Lee Howl; 6 in. by 9 in. by 12 in., with 4 in. suction and delivery; steam driven.

TWO—Electrically-driven 4 in. Lead-lined **CENTRIFUGAL PUMPS** by Kestner; 4 in. suction and delivery; direct coupled to 12½ h.p. motors, 400 volts, 3-phase, 50 cycles, by Laurence Scott, 1,950 r.p.m.

THREE—1½ in. Douglas **CONCENTRIC SPIRIT PUMPS,** each arranged Vee drive from 1½ h.p. Crompton " Klosd " squirrel-cage motor, 400 volts, 3-phase, 50 cycles, 725 r.p.m., with starter.

VACUUM OVEN or STERILISING RETORT, complete with hinged doors at either end, closed by swing bolts and complete with two drying trolleys.

VACUUM OVEN by Scott; 44 in. wide by 6 ft. deep by 5 ft. 6 in. high; tray type shelves formed of ½ in. steam piping and arranged to carry 40 trays, 20 each side; door opens on overhead rollers; construction is boxed casing.

GEORGE COHEN SONS & CO., LTD., STANNINGLEY, near LEEDS, and SUNBEAM ROAD, PARK ROYAL, LONDON, N.W.10.

CHARCOAL, ANIMAL, and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., " Invicta " Mills, Bow Common Lane, London, E. Telegrams, " Hill-Jones, Bochurch, London." Telephone: 3285 East.

FOR sale, *ex* stock, Dark Blue Bottles, " Poison." Hex. ribbed, stoppered; 2 oz, 4 oz., 8 oz., 20 oz., 40 oz., 80 oz. White Square Chest Bottles, stoppered N.M.; 1 oz., 2 oz., 4 oz., 8 oz., 16 oz., 24 oz., 32 oz. Also 1 oz. bottles with drop stopper for passive defence. All new. Large quantities available. Inquiries to

GORNEY, LTD.
35 Northumberland Street, Manchester, 7.

KIBBLING MACHINE, double rolls 8 in. dia. by 30 in. double geared feed hopper, fast and loose pulleys, balance wheel. Price £95 with spares. **Thompson & Son (Millwall), Ltd.,** Cuba Street, Millwall, London, E.14.

METAL Powders and Oxides. Dohm Limited, 167, Victoria Street, London, S.W.1.

FOR SALE

MORTON, SON & WARD LTD.
OFFER

MIXING PLANT.
Second-hand Underdriven M.S. Mixer, 4 ft. 3 in. dia. by 2 ft. 6 in. deep for heavy duty, fast and loose pulley drive.
TWO New Steam-jacketed Mixing Pans, open-top, 3 ft. dia. by 3 ft. deep, 100 lbs. per sq. in. w.p. M.S. welded and riveted construction, 2 in. bottom outlets.
NEW—'Morward' Dry Powder Mixers with U-shaped pans, 2 ft. by 2 ft. sections; size range 4 ft. to 8 ft. lengths, delivery 3 to 4 months.

STORAGE TANKS.
Enclosed Rectangular.
THREE—1,100 galls. 7 ft. by 5 ft. by 5 ft. welded.
ONE—500 galls. 7 ft. by 4 ft. by 3 ft. welded.
TWO—230 galls. 5 ft. by 3 ft. by 2 ft. 6 in. welded.
Open Rectangular.
ONE—3,400 gall. 9 ft. 6 in. by 9 ft. 6 in. by 6 ft. riveted.
ONE—2,700 gall. 16 ft. by 6 ft. by 4 ft. 6 in, riveted.
ONE—800 gall. 7 ft. by 5 ft. by 4 ft. 6 in. welded.
ONE—650 gall. 7 ft. by 3 ft. by 5 ft. riveted.
ONE—300 gall. 6 ft. by 4 ft. by 2 ft. 6 in. welded.
FIVE—150 gall. 4 ft. by 3 ft. by 2 ft. welded.

SEPARATORS.
FIVE—New and unused Alfa Laval Industrial Separators, 100 galls. per hour. Type 3045, inbuilt motors and pumps. 215 v. D.C. Tools and spares included.

AIR RECEIVERS.
ONE—6 ft. dia. by 6 ft. deep dish ended. 100 lb. w.p.
ONE—3 ft. 9 in. dia. by 5 ft. deep dish ended. 100 lb. w.p.
ONE—2 ft. dia. by 2 ft. 6 in. deep dish ended. 100 lb. w.p.

MORTON, SON & WARD LTD.,
WALK MILL, DOBCROSS, Nr. OLDAM, LANCS.
'Phone – Saddleworth 437.

Phone: Staines 98.

HAND Hydraulic Press and Pump; Johnson Filter-Press, 14 plates 26 in. dia.; 800 galls. mild steel still and condenser; Jacketed aluminium pan (A.P.V.), 48 galls; 300 galls. earthenware pan with stainless mixer 2,500 galls. enclosed galvanised spirit tank

HARRY H. GARDAM & CO. LTD.
STAINES.

QUANTITY of Jeyes' Concentrated Sterilising Fluid packed in one-gallon cans. Quotation, sample and formula on request.

CARBOT LIMITED,
201, Long Lane, London, S.E.1.

TWO—New 100 gallon capacity **STAINLESS STEEL STORAGE TANKS.** Portable trolley type, constructed from F.D.P. 18 gauge material.
Single roll **OINTMENT MILL,** having revolving pan 30 in dia. by 5 in. deep. Marble scrape and base. Adjustable marble roller 18 in. dia. by 7 in. face. Fast and loose pulley drive.
"Moonshine" Whisk, comprising **OVERDRIVEN CHANGE PAN MIXER,** having stainless steel pan 18 in. dia. by 18 in. deep, carried on rising and falling carrier, hand operated through worm-wheel; one set of beaters available.
Horizontal **RECESSED PLATE TYPE FILTER PRESS** by **DEHNE,** having five 18 in. sq. recessed c/l plates making cakes about ¾ in. thick.
Complete **VACUUM DISTILLATION AND EXTRACTION PLANT,** comprising 30 gallons capacity steam-jacketed Copper Still with sight and light glasses, vacuum gauge, fractionating column, swan neck, 6 in. condenser, extraction pot, liquid receiver, secondary auxiliary condenser and pulsometer "Geryk" vacuum pump.

REED BROS. (Engineering) LTD.,
Bevis Marks House, London, E.C.3.
'Phone – Ave 1677/8. 3730. 'Grams – "Replant, Ald." London.

FOR SALE

B. C. S.

(1) 125 gall. capacity Stainless Steel Steam-jacketed Hand-tilting Mixer by Adlam, Bristol; pan, 3 ft. 6 in. dia. by 2 ft. 6 in. deep with dished bottom; stainless steel stirring gear. As new.
(2) 10 gall. capacity Stainless Steel Steam-jacketed Mixer by Brierley Collier & Hartley; pan, 1 ft. 6 in. dia. by 11 in. deep, rise-and-fall motion to pan; stainless mixing gear. (Seven available).

B.C.S. (ENGINEERS—CONTRACTORS) LTD.,
TAFFS WELL, nr. CARDIFF.
'Phone: Taffs Well 296.

TWO very fine **GARDNER HORIZONTAL STEAM JACKETED MIXERS AND DRYERS,** 4 ft. long by 15 in. dia. by 15 in. deep, segmental spiral blade, end bottom discharge; one arranged for "Vee" belt drive and one for flat belt drive.

REED BROTHERS (Engineering) LTD.
Bevis Marks House, London, E.C.3.

---

2 Vertical Stearine Presses
1 Hydraulic Baling Press
2 Shirtliffe Baling Presses
48 in. Belt-driven Hydro
42 in. Under-driven Hydro
36 in. Iwel Steam-driven Extractor
10 in. 2-roll Bone Mill
Jacketed Mixing Pan, 7 ft. dia., 9 ft. deep
7 various Filter Presses
2 Haden Calorifiers
Several Copper-built Enclosed Tanks
14 Welded Steel Enclosed Oil Tanks
7 Open-top Oil Storage Tanks.
18 in. 4-roll Toothed Crusher, belt and gear driven
Ball-bearing Gravity Conveyor, 6 in. pitch, 14 in. wide, 8 ft. lengths
Band Conveyors, 30 ft. and 40 ft. centres by 12 in. wide
12 Vertical Weir & Hall Steam Pumps
Several small Steam-jacketed Copper Pans
Plate and Frame Filter Press, 19 in. square.
Small Jacketed Filter Press
Wood Filter Press, 24 in. by 28 in.
Three C.I. Sectional Tanks
Broom Wade Compressor with Receiver
Aluminium Storage Vessel
Several Ball Mills, 6 ft. 6 in. by 6 ft. 8 in. Silex lined, batch type, with driving gear and clutch.

Write: **RICHARD SIZER, LIMITED, ENGINEERS CUBER WORKS, HULL.**

100-200 LEAD LINED BOXES suitable for Acid Vats, dimensions 14 in., 18 in., 23 in. deep. Box. No 2425, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

1000 STRONG NEW WATERPROOF APRONS, To-day's value 5s. each, Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills Preston, Lancs. Phone 2198.

10,000 lbs. Zinc Phosphide packed ¼-lb. hermetically sealed tins. 25 cwts. Sodium Thiosulphate packed partly raw drums, made-up kegs, tabletted kegs. For full details apply Box No. 2076, G.T.C., 82–94, Seymour Place, London, W.1. PADdington 3456.

AUCTIONEERS, VALUERS, Etc.

EDWARD RUSHTON, SON AND KENYON
(Established 1855).

Auctioneers' Valuers and Fire Loss Assessors of CHEMICAL WORKS, PLANT AND MACHINERY,
York House, 12 York Street, Manchester.

Telephone 1937 (2 lines) Central, Manchester

SERVICING

GRINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Suppliers of Ground Silica and Fillers, etc. JAMES KENT, LTD., Millers, Fenton, Staffordshire. Telegrams: Kenmil Stoke-on-Trent. Telephone: 4253 and 4254, Stoke-on-Trent (2 lines).

GRINDING of every description of chemical and other materials for the trade with improved mills.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hill-Jones, Bochurch, London." Telephone 3285 East.

LONDON FIRM offers complete service packing powders of all descriptions, also liquids and chemicals. Long runs only. Containers and packing cases of home and export, made on premises. Near to docks. Own rail sidings. Box No. 2331, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

PULVERISING and grading of raw materials DOHM LTD., 167, Victoria Street, London, S.W.1.

WANTED

OINTMENT Mill wanted. Box No. 2420, THE CHEMICAL AGE, 154, Fleet, Street London, E.C.4.

REGULAR quantities of Castor Oil or Dehydrated Castor Oil required for advertisers' own use. Write stating price, delivery time and quantities available to Box No. 2416, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

RESEARCH accommodation wanted, small workshop or two spare rooms in large laboratory or small building suitable for conversion, for purchase or rent. Write Box No. 2422, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

WANTED Nickelformate for export purposes. Box No. 2424, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

WANTED.—Supplies of Nitre Cake in ten-ton lots, Box No. 2126, THE CHEMICAL AGE, 154, Fleet Street London, E.C.4.

WORKING NOTICE

THE Proprietors of the Patent No. 513,604 for "Improvements in or relating to Alloying Molybdenum with Ferrous Metals," and 513,853 for "Improvements in or relating to Alloying Tungsten with Ferrous Metals," are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for the purpose of exploiting the same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to HASELTINE LAKE & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

DO

SC

Printed in Great Britain by THE PRESS AT COOMBELANDS, Ltd., Addlestone, and published by BENN BROTHERS LTD., at Bouverie House, 154, Fleet Street, E.C.4, 8 February 1947. Registered at the General Post Office. Entered as Second Class Matter at the New York, U.S.A., Post Office.